4 Environmental Consequences

4.1 PROPOSED ACTION

4.1.1 Geology/Soils/Mineral Resources

4.1.1.1 Assumptions and Assessment Guidelines

This section assesses impacts to geologic, soils, and mineral resources that could result from the proposed Mesquite Mine expansion. A significant impact would be one in which the Proposed Action would:

- Result in substantial uncontrolled changes in natural erosion and sediment transport in the mine area or in the surrounding desert environment.
- Be damaged, destroyed, or expose a substantial number of people to seismic hazards, as a direct consequence of a geologic event.
- Release substantial quantities of ore processing fluid from the leach pad expansion into the environment as a result of a geologic event.
- Substantially restrict the ability to utilize geologic (mineral) resources.

4.1.1.2 Impacts of the Proposed Action

Soils

Four of the five soil types in the project area have minimal or no erosion potential (Borst, 1983). The one soil type susceptible to displacement is unidentified sandy loam, which comprises the smallest percentage of the five (i.e., estimated at about 10 percent of the total soil present). This type of soil generally occurs on steeper slopes in the project area, which are naturally erosion prone.

Runoff from local precipitation could cause minor erosion on the manufactured slopes of the OISAs. Currently, the tops of the overburden/interburden piles are graded to avoid concentrating runoff to slope areas. Based on experience at the Mesquite Mine with this design, along with the coarse-grained nature and high infiltration characteristic of dumped material, the erosion potential for the new OISA's is low.

The Mesquite Mine is crossed by a channel that carries stormwater through the site (Figure 2.1-1). It is necessary to convey stormwater around project facilities to allow for safe operations and for long-term stability of the mine pits, OISAs and heaps. The proposed expansion would require construction of new drainage diversions at three locations near the mine pits: the East Rainbow Pit Diversion Channel in Sections 3 and 10; the North Extension Diversion Channel in the north half of Section 5; and the Vista Diversion Channel in Sections 4, 8 and 9.

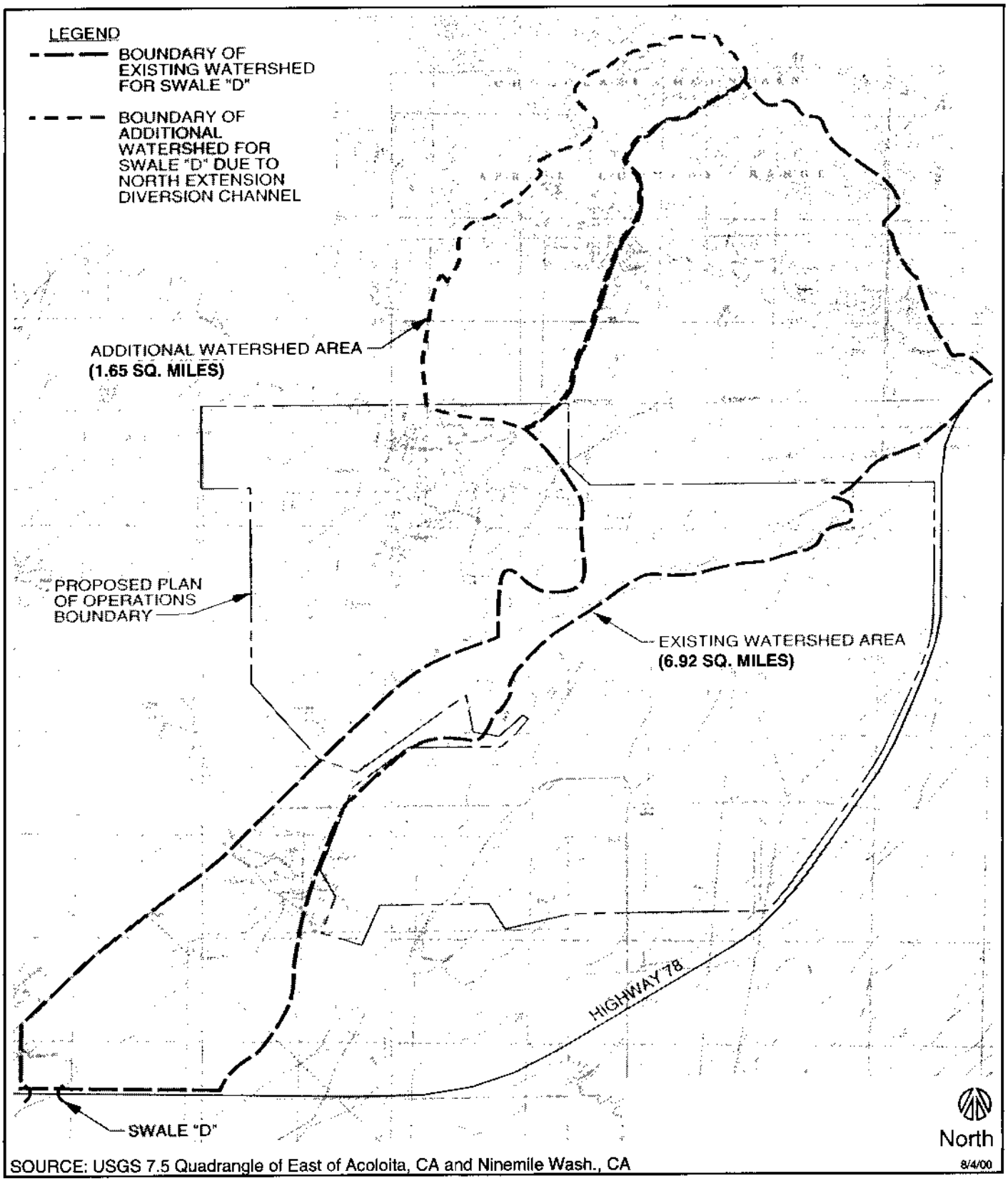
The East Rainbow Diversion Channel and the Vista Diversion Channel are short diversions that do not materially change the watershed area or discharge location compared to existing flows. Both would be designed to fully convey stormwater flows around facilities without increasing flood hazards or otherwise affecting the hydrology of the area. The flow paths will be slightly longer through the new diversion sections, resulting in a slightly flatter overall gradient that will not be prone to above-normal levels of erosion.

The North Extension Diversion Channel will result in runoff being diverted through the mine area from approximately 1.65 square miles of additional watershed that drains to the west of the mine area under existing conditions, as shown in Figure 4.1.1-1. The North Extension Diversion Channel would be designed to accommodate the additional runoff from the 1.7 m^2 watershed and the fully convey stormwater flows through the mine area without adversely affecting the hydrology of the area. The flow path for runoff from this additional area will be lengthened, reducing the overall gradient.

The Proposed Action would be constructed and operated in accordance with a Stormwater Pollution Prevention Plan (SWPPP) as required under the State of California NPDES General Construction Activity Permit. In accordance with the General Permit, a SWPPP identifying Best Management Practices to control erosion and a Monitoring Plan shall be developed and implemented concurrently with commencement of grading activities, and a complete and accurate Notice of Intent (NOI) shall be filed with the SWRCB. Upon completion of construction, and throughout the project's life, the Proposed Action may also require a NPDES permit for any point source discharge in the surface waters and State Waste Discharge Requirements for discharges to land. Therefore, erosion impacts would not be significant.

Mineral Resources

Condemnation borings drilled by Mesquite Mine geologists have been used to determine the limits of gold ore bodies. These borings indicate that valuable mineral resources common to the project area do not exist beneath the proposed locations of OISAs or the leach pad expansion. Therefore, adverse impacts to valuable economic mineral resources would not occur as a result of the proposed



Mesquite Mine Expansion EIR/EIS

Swale "D" Drainage Area

FIGURE

4.1.1-1

expansion. The expansion would allow recovery of gold from ore reserves identified in the Big Chief and Rainbow Pit areas.

Leaseable Mineral Resources

No geothermal or other leaseable mineral resources occur at or near locations of the Proposed Action. Therefore, no significant impacts would occur.

Seismicity

Holocene faults do not exist within or adjacent to the project site and, therefore, surface rupture in the event of an earthquake is not likely. The nearest potentially active fault is located approximately 9 miles from the proposed site (Section 3.1.6). Regional seismicity is not expected to cause large ground motions at the project site. Also, current Uniform Building Code seismic safety standards would be applied to all new building designs. Emergency power from on-site diesel generators would be provided to keep essential facilities operating (e.g., leach solution circulation) in the event of power failures caused by regional seismic activity. Therefore, impacts would not be significant.

4.1.1.3 Mitigation Measures

Incorporated by Regulations

The Applicant shall construct and operate the proposed expansion facilities in accordance with the rules and regulations established by the SWRCB and RWQCBs. These requirements include: 1) implementing a Storm Water Pollution Prevention Program incorporating Best Management Practices (BMPs) in acccordance with the Statewide General Construction Activity Stormwater Permit; and a stormwater quality monitoring program to evaluate the effectiveness of the program. 2) Obtaining 401 Water Quality Certification, or waiver thereof; and 3) providing post-construction BMPs that are to be maintained after construction, throughout the life of the project. BMPs for control of erosion during both construction and operation shall be implemented as part of this program.

The Applicant shall design and construct project structures (e.g., relocated mine buildings) that are subject to the Uniform Building Code according to Seismic Zone 4 standards, which are the most stringent in the Uniform Building Code. Implementation of Seismic Zone 4 standards would satisfy current Building Code Requirements of the Imperial County Planning and Building Department.

The applicant shall implement the following measures to minimize potential effects of seismic activity:

- The Applicant shall complete final pit wall design in conformance with SMARA requirements. Pit slope parameters will be determined and reviewed by California registered civil engineers, with appropriate safety factors based on their professional experience. Final pit design shall be

submitted to the California Department of Conservation, Office of Mine Reclamation (OMR), for review. Final decisions about pit design parameters shall be made by the County of Imperial, which has been delegated this authority under provisions of SMARA.

- Benches shall be provided in the pit walls at regular intervals to catch minor sliding or raveling.

- Options that Applicant and the mine engineers will consider to ensure pit slope stability include: 1) reducing the final slope angle; 2) unloading (removing material from) the top of the slope; 3) providing buttresses for steep slopes; and/or 4) backfilling waste rock at the base of the excavated slopes.

- Leach pad and OISA slopes shall be constructed with benches for stability.

The Applicant shall implement the following measures to minimize offsite erosion:

- The Applicant shall ensure that peak flow conditions are substantially the same as those that would have occurred without the proposed expansion. Swale "D" flows would increase from current levels, but are equivalent to historic flows.

- The Applicant shall incorporate stable channel configurations and/or protection such as riprap to limit erosion.

Incorporated to Avoid Significant Impacts

Given implementation of the regulatory mitigation measures listed above there would be no potential for significant impacts to geology, soils, or mineral resources from the Proposed Action.

4.1.1.4 Level of Significance After Mitigation

Based upon regulatory requirements that would be incorporated into the Proposed Action no significant impacts to geology, soils, or mineral resources impacts would occur, and no additional mitigation is necessary.

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4.1.2 Water Resources

4.1.2.1 Assumptions and Assessment Guidelines

This section assesses impacts to water resources that could potentially result from the Proposed Action. This assessment also identifies measures that will be taken to comply with state water quality control regulations, and control factors incorporated into the project design, which would reduce potential impacts to below the level of significance. For purposes of this analysis, a significant impact would be one which:

- Alters surface flow conditions resulting from short-term precipitation events in a manner that is uncontrolled or substantially changes existing flow conditions.

- Results in stormwater flow conditions at Highway 78 that exceed the capacity of existing highway wash crossings.

- Degrades precipitation runoff quality such that other uses of the water would be substantially limited.

- Degrades ground water quality or reduces water quantity such that the beneficial uses of water would be substantially limited.

- Substantially reduces ground water recharge to the Amos-Ogilby hydrologic basin.

· Results in an uncompensated loss of Waters of the United States.

As discussed in Section 2.1.5, the primary source of water for dust control, ore processing and other needs would be the existing water supply wells and pit dewatering. The rate and quantity of water extraction from these wells would remain within the amounts already permitted for the Mesquite Mine. This water withdrawal has been analyzed in prior CEQA/NEPA documents for the Mesquite Mine and found to have impacts that are less than significant (Environmental Solutions, Inc., 1987).

4.1.2.2 Impacts of the Proposed Action

Surface Water

Certain aspects of mine area construction would have the potential to alter infiltration and runoff. These include surface compaction on site roads, filling of minor drainages, the construction of OISAs, and the capture of direct precipitation in the mine pits. Other than the small new leach pad expansion which would capture direct precipitation, new impermeable surfaces (e.g., roofs, asphalt paving) are not proposed. Onsite roads would be constructed with the minimum necessary grading. Runoff from most precipitation events would be absorbed or evaporated. During infrequent large storms, there may be increased runoff from road surfaces, however, any such increase from the Mine would not be significant

because Mine roads would cover represent only a small fraction of the surface area available for infiltration, and because any increase in runoff from the roads would be offset by capture of direct precipitation in the Mine pits and infiltration into the OISAs. Upstream diversions would preclude significant capture of runoff by the Mine pits. The OISAs are expected to have a higher than normal infiltration rate because of the porous nature of the material. For these reasons, a net reduction in runoff from the Mine area is expected.

The proposed expansion would require construction of three new drainage diversion channels. The East Rainbow Diversion Channel and the Vista Diversion Channel are short diversions that do not materially change the watershed area or discharge location compared to existing flows. The North Extension Diversion Channel will result in runoff being diverted through the mine area from approximately 1.65 square miles of additional watershed that drains to the west of the mine area under existing conditions, as shown in Figure 4.1.1-1 under Geology/Soils. The flow path for runoff in each of the three diversions would be lengthened, resulting in a slightly flatter overall gradient that would not be prone to above-normal levels of erosion. The additional watershed area contributing flow through the mine area would not result in a significant impact because the channels would be designed and maintained to provide protection to the mine facilities, and because downgradient of the diversions the wide braided wash network would naturally accommodate the increased flow without substantial changes to flow conditions. Changes to flows in individual channels would not be unlike naturally occurring changes that are characteristic of braided washes.

Based on the existing U.S.G.S. topographic map of the area, and the locations of proposed diversions, channel slopes of the existing washes were compared to the proposed diversion channel slopes. The four primary washes upstream from the North Extension Diversion Channel have slopes ranging from 1.8 to 2.4 percent. The slope of the proposed North Extension Diversion Channel is 0.5 percent (per Hanson, April 1998). Below the diversion channel, the natural washes have slopes of 1.2 to 1.4 percent. The East Rainbow Diversion has a proposed slope of 0.8 percent. The two major washes upstream from it have slopes of 2.1 and 2.2 percent. Below the diversion, the natural washes decrease in slope to 1.8 and 1.9 percent.

The diversion channel berm would be protected with riprap at the transition where it connects with the natural washes, in order to minimize erosion. The decreased slope in the diversion channels (0.5 percent) would serve to slow down the rate of water flow. Flow rates would increase when the diversion delivers the water to the natural channel downstream. Peak flows for the North Extension Diversion Channel and the East Rainbow Diversion under a 100-year, 6-hour storm event are projected to reach 2,330 and 300 cfs, respectively (Hanson, April 1998).

A hydrologic/hydraulic evaluation was completed to confirm that flow from the additional watershed area diverted by the North Extension Diversion Channel would not adversely impact Highway 78. The affected wash crosses Highway 78 at a shallow wide channel referred to as "Swale D" (Figure 4.1.1-1). The analysis was performed using U.S. Department of Agriculture Soil Conservation Service rainfall distribution curves and the "HEC-1" computer modeling program developed by the COE. Detailed modeling results are provided in Hanson, 1999. The wash at Swale D is approximately 1,100 feet wide

and has a total depth of about 3.5 feet. Modeling indicates that the normal depth of the 100-year, 24-hour storm runoff at Swale D with the proposed North Extension Diversion Channel in place would be about 2.3 feet deep. The estimated normal depth of the 500-year, 24-hour storm runoff would be about 2.7 feet. Because even the 500-year, 24-hour storm would stay within the approximately 3.5 foot deep swale. The impact to hydrology at the Swale D wash crossing is considered less than significant. These results indicate that the likelihood of a 24-hour storm runoff event overtopping the swale is less than one-in-five-hundred for any given year. Nevertheless, Newmont will be required to consult with Caltrans prior to modifying flows to Swale D, to assure that Caltrans requirements for additional erosion protection, if any, are satisfied.

A review was performed by the owner of the Mesquite Landfill project, Arid Operations, Inc., to determine if the expansion would affect the landfill project. Arid Operations, Inc. determined that based on its preliminary review, the proposed expansion would not significantly affect the landfill drainage design.

Hydrocarbon fuels, ore processing reagents, and other potentially hazardous materials would be stored in aboveground tanks or other appropriate containers at the Mine site. Bulk petroleum products and reagents would be stored within containment areas to prevent uncontrolled releases. There would be the potential for minor hydrocarbon leaks/spills from equipment (e.g., trucks) that would be used for mining operations. Any such spills likely would be small, and easily excavated and removed for subsequent treatment and/or removal from the site.

The heap leach pad would be operated in accordance with CCR Title 27 regulations for mining units, and Newmont would be required to operate the heap leach pad pursuant to WDRs from the RWQCB that implement appropriate provisions of Title 27. These requirements include criteria for protecting ore processing facilities from run-on and for operating in a manner that protects against release of process fluids or other constituents that may adversely affect surface water quality. With these requirements in place, significant effects to surface water quality are not expected. The Mesquite Mine has operated for 15 years under this regulatory framework, and significant effects to surface water quality have not occurred.

Figure 3.2-5 shows the location of mine pit lakes for current mining conditions. The proposed expansion of the Big Chief and Rainbow mining areas would result in changes to the configuration of the pit lakes. The pit lakes would remain isolated from naturally-occurring surface water and would have no adverse or beneficial impact to surface water resources. Potential affects of the pit lakes on ground water resources and the chemistry of water expected to occur in the pit lakes are described under the topics of Ground Water Quality and Ground Water Quantity in the following sections.

Waters of the United States

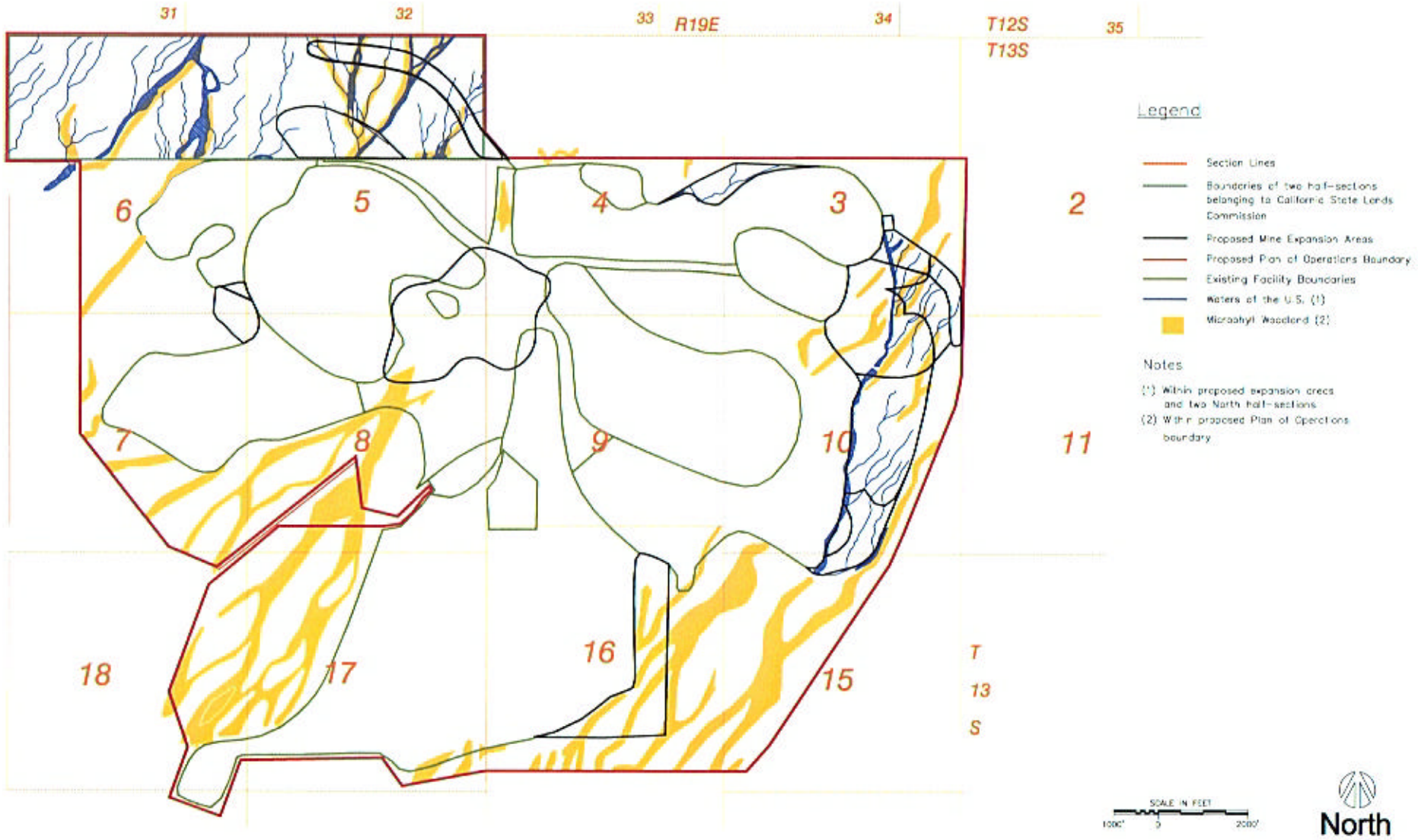
As described in Section 3.2.2.1, consultants conducted surveys to identify federal jurisdictional "Waters of the United States" including wetlands in and around the project area. See Jones & Stokes, August and Sept. 1999 for details. The surveys included each of the principal washes within the project area, as well

as tributaries, to determine which met the criteria of "waters" and "Waters of the United States." No jurisdictional wetlands were identified within the existing Mine area. The Proposed Action would result in new surface disturbances that would include 24.97 acres considered by the consultants to qualify as "Waters of the United States." Of that area, approximately 15.93 acres would be in areas already permitted for Mine disturbance by the BLM and Imperial County, and 9.04 acres are located in areas without current permits. The actual acreage of Waters of the U.S. will be determined by the ACOE as part of the concurrent Section 404 process. Impacts to the Waters of the U.S. are considered significant by the Army Corps of Engineers. Locations of the delineated waters relative to the Proposed and Alternative expansion areas are shown in Figure 4.1.2-1. Acre totals by expansion area are shown in Table 4.1.2-1.

Impacts to Waters of the U.S. by the proposed pit expansions are unavoidable if known ore bodies at the mine site are to be accessed and processed. Surface water drainages must also be diverted around the pits in order to minimize accumulation of water in the pits. The East Rainbow Diversion is located immediately adjacent to the proposed East Rainbow Pit Extension, thus minimizing additional disturbance to waters of the U.S. It would have been desirable, as well, to keep the North Diversion channel close to the proposed Big Chief North Extension. That, however, would require water to flow uphill in order to connect to the north end of the Vista Diversion channel through the Mine area. The North Diversion channel location that has been proposed allows for gravity flow to the Vista Diversion channel. OISA locations were chosen to minimize haul distances and surface disturbance .

It is proposed that any impacts to Waters of the U.S. will be mitigated through the compensation process for desert tortoise habitat. It is anticipated that title to more than 1,300 acres of high-quality tortoise habitat would be conveyed by Newmont to the BLM, as mitigation for Project-related loss of desert tortoise habitat. Please see Section 4.1.3 for a more detailed discussion of biological impacts and compensation. Further provisions of this compensation provide that the lands to be conveyed will include and preserve microphyll woodland at a 3:1 mitigation ratio. Consistent with the Section 404 process, appropriate acres of Waters of the U.S. will be preserved in this transaction as well. With preservation of the waters within the proposed compensation area, impacts to Waters of the U.S. would be considered less than significant.

No additional Waters of the U.S. will be dredged or filled as a result of reclamation activities described in Section 2.1.7. Only in the areas disturbed by prior mining activities will the ground surface be prepared and then seeded with native plants. Furthermore, the relationship between planned reclamation measures and mine expansion mitigation measures was reviewed, and no additional impacts to mine expansion mitigation measures were identified.



SOURCE: Newmont Gold Company, 1999, 2000; Jones and Stokes, 1999.

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4.1.2-5

Mesquite Mine Expansion EIR/EIS

Waters of the U.S.

FIGURE

4.1.2-1

Table 4.1.2-1

Estimated Waters of the U.S. (Acres) By Proposed Expansion Area Proposed Action, Mesquite Mine Expansion

Expansion Area	Proposed Action		
	Previously Permitted	Not Permitted	TOTAL
North Extension, Big Chief Pit	0.00	1.84	1.84
Big Chief Pit South and Southeast Extensions (a)	0.00	0.00	0.00
East Rainbow Pit Extension	3.68	0.70	4.38
Big Chief West OISA	0.00	0.00	0.00
East Rainbow North OISA	1.70 (b)	0.00	1.70
East Rainbow South OISA	8.25	3.48 (b)	11.73
East Rainbow Diversion Channel	2.30	0.24	2.54
North Extension Diversion Channel	0	2.78	2.78
Heap Leach Pad No. 6 Expansion	NA (c)	NA (c)	NA (c)
TOTALS	**15.93**	**9.04**	**24.97**

Source: Jones & Stokes, 1999, 2000; BRG Consulting, Inc., 2000.

(a) The area was previously disturbed by ancillary mining activities.

(b) Extrapolated by BRG Consulting, Inc. from Jones & Stokes data.

(c) All of Section 16 was previously permitted for heap leach pad disturbance, and compensated.

Ground Water Quality

Potential impacts to ground water quality at the site could occur in two general ways:

- If sufficient infiltration were to occur, dissolved constituents could be transported downward to ground water.

- Mine pit lakes could impact the quality of water surrounding the pits.

The potential for these impacts to occur is further described in the following subsections.

Infiltration of Dissolved Constituents

Ore that is excavated under the proposed expansion would be processed at heap leach facilities that would be contiguous with existing facilities. Ore processing operations could leak or spill processing fluids if the ore processing facilities are not appropriately designed, constructed and operated. Newmont would be required to construct and operate the leach pad expansion in accordance with CCR Title 27 and with WDRs as approved by the RWQCB. These regulations and the requirement for WDRs to be issued are designed to protect water quality. The RWQCB would require routine monitoring and reporting of relevant operational parameters and leak detection systems. With these requirements, significant ground water quality impacts are not expected to occur from ore processing activities related to the proposed expansion. The Mesquite Mine has operated for 15 years under this regulatory framework and impacts to ground water quality have not occurred.

Petroleum products (e.g., fuels, lube oil, hydraulic oil) used to support mining activities could impact ground water if a substantial leak were to occur. Fuel and oil storage already occur at the mine and the expansion would utilize existing facilities. The proposed expansion would not increase the potential for fuel and oil storage to impact ground water, but it would prolong the ongoing use of these products onsite. To mitigate the potential for fuel and oil to impact ground water, bulk petroleum products are stored aboveground in designated areas with appropriate secondary containment for potential spills, and these areas are monitored to assure that leakage is not occurring. With these measures, fuels and oil use at the site are not expected to impact ground water quality.

Precipitation infiltrating through OISAs could carry soluble constituents from the overburden/ interburden if high levels of soluble constituents were to be present, or if overburden/interburden were to have a net acid generating potential. Extensive geochemical testing has been performed on the Mesquite Mine overburden/interburden, as described in Section 3.1.3.4 and the Baker study, 1999. Soluble metals concentrations in these materials are generally low and the material is not acid generating. Because of these characteristics, and because of the low annual precipitation that occurs at the site, the OISAs would not have a significant impact on ground water quality.

Mine Pit Lakes

Modeling was performed (described in detail in Baker, 1999) to evaluate potential pit water conditions. The primary factors affecting the chemistry of the water in the mine pits will be the naturally occurring

chemistry of ground water surrounding the pits, and the high evaporation rate which will concentrate dissolved constituents introduced to the pit by ground water inflow. The pit lake water chemistry and ground water quality impact conclusions in this section are generally valid for the rock units planned to be mined.

During mining, ground water seeping into the pits that does not evaporate would be removed and used for dust control. After mining in each pit is completed, the respective pit lake would fill with water until the lake surface is large enough to evaporate water at the same rate as inflow occurs. Based on flow net calculations described in Section 3.2.3.1, ground water flow through the upper 300 feet of the saturated zone in the area of the mine pits is approximately 100 gpm. For this amount of steady-state flow into the mine pits, and given the approximately 80 inches per year of lake evaporation that is characteristic of the site climate, the combined total surface area of the pit lakes would be about 24 acres.

Pit lakes are expected to occur in the bottoms of the Big Chief North, Big Chief South, Big Chief Southeast, East Rainbow and Vista Pits. The actual time required for each lake to fill to its equilibrium level will depend upon the as-built configuration of the pits. In general, the individual pits are expected to reach their equilibrium level within times ranging from several years to several decades, depending upon the configuration of each pit. The depths of the lakes will vary from pit to pit, and may be shallow to relatively deep (i.e., depths may vary from on the order of ten feet to more than 100 feet).

Ground water in the pit areas is deep below the ground surface (Section 3.2.3.1). Therefore, the pit lake surfaces will be far below the pit rims and overtopping of the pit rims will not occur.

Initially, the pit water chemistry will be similar to the existing pit water (Table 3.2-7), with TDS concentrations generally in the 1,500 to 4,000 mg/L range. At the time that each pit lake reaches its equilibrium surface level, TDS concentrations are expected to generally range from about 5,000 to more than 10,000 mg/L (Baker Consultants, Inc., 1999). Because evaporation is the primary source of outflow, and because of the high evaporation rate and low precipitation, over the long-term the TDS will increase and the lakes will become saline with dissolved constituent concentrations near saturation. This evapoconcentration will result in the long-term chemistry of the pit lakes under the Proposed Action being approximately the same as the long-term water chemistry described in Section 3.2.3.5 for the existing mine pits. The reader is referred to that section for a more detailed discussion of water chemistry, including a comparison of pit lake water quality to certain water quality standards.

The additional impacts that would occur for the Proposed Action (compared to the currently permitted pits) are that: (1) the total area and volume of water in the pit lakes will be larger; and (2) the rate at which, evapoconcentration will occur may be different. In general, it is expected that the individual lakes that would occur for the Proposed Action would have a volume/surface area ratio that would be either similar to or larger than lakes that would occur in the currently permitted mine pits, which would result in a similar or slower rate of evapoconcentration.

Modeling indicates that for the out-of-pit OISA configuration of the Proposed Action, ground water would not flow through any of the mine pits. The pit lakes will be evaporative sinks, and the ground

water flow direction will be toward the pits from all directions. Because the ground water flow will be toward the pits from all directions, the build-up of dissolved constituents in the pit lakes will not affect water quality away from the mine pits.

Saline lakes would be expected to occur in the bottom of the mine pits as previously described in this section. The impact of these lakes on ground water quality will be less than significant because:

- The long-term pit lake chemistry will not be substantially different under the Proposed Action compared to that which would occur for the currently permitted pits.

- The ground water gradient will be toward the pits from all directions, so the buildup of dissolved constituents will not affect water quality away from the mine pits.

- No current or foreseeable beneficial uses of water would be affected.

Ground Water Quantity

Due to evaporation of water from the mine pit lakes and the relatively low permeability of rock surrounding the mine pits (Table 3.2-3), the pit lake surfaces will equilibrate at an elevation that is lower than the top of the saturated zone as it occurred prior to mining. The inflow to the mine pits during mining and following mining will result in a localized drawdown of ground water surrounding the mine pits. The amount of drawdown will vary with time and distance from each pit. The maximum drawdown adjacent to the Mine pits will occur at the cessation of mining, when dewatering ceases. Recovery of the ground water levels surrounding the mine pits will occur as lake levels rise, but evaporation will preclude complete recovery. No measurable ground water level impacts are expected to occur at wells not related to the Mesquite Mine. Other than mine uses, there are no known ground water users in the subbasin. In addition, the low yields characteristic of wells completed in the subbasin (Table 3.2-1) and the poor water quality (Section 3.2.3.4) limit the potential for future beneficial uses to be developed. Due to the lack of ground water users, limitations on foreseeable beneficial uses, and localized nature of drawdown, the impact of drawdown due to the mine pits will be less than significant.

The localized lowering of the ground water table in the vicinity of the mine pits will "capture" ground water seepage from upgradient areas. Captured seepage will be pumped and used (e.g., for dust control during mining), or will evaporate from the mine pit lake surfaces, instead of seeping through the subbasin that underlies the site and ultimately recharging the Amos-Ogilby ground water basin. The short-term maximum seepage into the pits during mining may total up to a few hundred gpm. After mining in each pit ceases and a pit lake begins to form, seepage into the pit will decrease as the pit lake level rises. Mine pit evaluations indicate that on the order of 100 gpm of ground water flows through the mine pit area in the upper 300 feet of the saturated zone. If this amount of seepage were captured by the mine pits over the long term, the impact of this capture on recharge to the Amos-Ogilby ground water basin would be less than significant. As discussed in Section 3.2.3.1, the Amos-Ogilby ground water basin is recharged primarily from the Colorado River and the All-American Canal. The 100 gpm flowing through the upper 300 feet of the saturated zone in the mine pit areas represents less than 2 percent of the

recharge to the Amos-Ogilby basin. The long-term capture of ground water by the mine pits may be less because as the pit lake levels rise toward their equilibrium elevation, inflow to the pits will be reduced. In addition, the actual impact of the proposed expansion is less than quantified herein because the existing pit lakes will capture a portion of this ground water seepage over the long-term if the expansion does not occur.

4.1.2.3 Mitigation Measures

Incorporated by Regulation

The Applicant shall incorporate the following water protection features into the proposed construction, operation, and closure of the expansion as required by CCR Title 27 mining regulations administered by the RWQCB:

- Design and construct diversion and drainage facilities to accommodate precipitation conditions associated with the 100-year precipitation event.

- The heap leach pad expansion shall not be located on a Holocene Fault. (No Holocene faults exist onsite).

- The heap leach pad expansion shall be constructed with a low permeability liner system to contain process fluids.

- Containment structures shall be designed by a Registered Civil Engineer, and construction shall be supervised and certified by a Registered Civil Engineer or a Certified Engineering Geologist.

- The heap leach pad expansion shall be operated with monitoring systems to allow detection of potential process fluid leakage in the subsurface.

- The leach pad expansion shall be closed in a manner such that, after closure, it no longer poses a threat to water quality.

- The OISAs shall be closed in a manner that will minimize erosion and the threat of water quality degradation from sedimentation.

- The Applicant shall construct and operate the proposed expansion facilities in accordance with their existing State of California NPDES General Permit for Stormwater. These requirements include implementing a Stormwater Pollution Prevention Program incorporating BMPs.

- The Applicant shall mitigate impacts to Waters of the U.S. as determined by ACOE in the Section 404 process. It is anticipated that such mitigation will involve preservation of appropriate acreage of waters within the proposed compensation for desert tortoise habitat.

Incorporated Into the Project Design

The Applicant shall incorporate the following additional water protection features into the proposed mine expansion design, construction, and operation.

- Design and construct the East Rainbow and Vista diversion channels to discharge flows at approximately the same locations and flow rates that occur presently or which historically occurred prior to the development of the mine diversion system.

- Repair abnormal erosion and take steps to prevent further occurrence in a timely manner.

- Store fuels and other bulk liquids with the potential to contaminate ground water in aboveground containers within containment areas.

Incorporated to Avoid Significant Impacts

There would be no potential for significant water resources impacts after mitigations required by regulations or incorporated into the project design are implemented. Therefore, no additional mitigation measures are recommended.

4.1.2.4 Level of Significance After Mitigation Measures

With mitigation, impacts would not be significant.

4.1.3 Biological Resources

This section is based on a biological resource report prepared by Nevada Environmental Consultants Inc. (NECI) for the proposed expansion.

4.1.3.1 Assumptions and Assessment Guidelines

In order to determine the potential significance of an impact to biological resources, it is necessary to determine both the relative importance of the resource and the degree of potential project-related impact to the resource. This section identifies the factors considered in determining the importance of the biological resources that occur in the vicinity of the proposed mine expansion areas, and the significance of impact.

In order to assess the impacts on the biological environment due to the proposed mine expansion, it was assumed that extraction of materials from the proposed pit extension will be done in the same fashion as the existing mining operation using front-end loaders, shovels, and haul trucks. The excavated material will be deposited on heap leach pads. Existing haul roads will be used to the extent feasible. If any new haul roads will be constructed, they will be constructed using existing mine equipment including graders, bulldozers, and water trucks. In addition, gold processing and extraction techniques would be similar to those currently being used at the Mesquite Mine. These techniques would alter the physical characteristics of the property through the excavation of open pits, the accumulation of waste rock, and construction of heap leach pads.

General Vegetation and Wildlife Categories

Biological resources are generally considered important if they are limited in distribution, or if their ecological role is critical within a regional or local context. Plants, animals, and habitat that meet the following criteria are therefore considered to be important biological resources:

- Communities, habitats, and populations of plant and animal species that are restricted in distribution.
- Habitat that is critical to a species or a group of species for feeding, breeding, resting, and migrating.
- Biological resources that are of scientific or educational interest because they exhibit unusual physiological, social, or ecological characteristics.
- Areas that serve as core habitats and surrounding buffer zones.
- Corridors or areas that link significant resources to facilitate ecological interchange.

- Habitats supporting species listed as rare, endangered, or threatened.

- Biological resources that are declining or have economic value.

Threatened and Endangered Species

Threatened or endangered species are those species that are in danger of extinction throughout all or a significant portion of their range. Threatened or endangered species are plants and animals that are legally protected under the California Endangered Species Act (CESA) and or the federal Endangered Species Act (ESA), or other regulations. Protected species include:

- Plants and animals that are listed or proposed for listing as threatened or endangered under the ESA (50 Code of Federal Regulations (CFR) 17.11 for listed animals; 50 CFR 17.12 for listed plants; various notices in Federal Register for proposed species).

- Plants and animals that are listed, or proposed for listing, as rare, threatened or endangered under the CESA (California Department of Fish and Game (CDFG), 1991).

- Animal species that are "fully protected" in California (CDFG Code, Sections 3511, 4700, 5050, and 5515).

Special-Interest Species

Special-interest plants and animals are those species that are vulnerable and recognized as rare (sometimes known as "sensitive") by scientists, conservationists, or agencies, and are therefore, afforded special consideration under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). Vulnerability may be due to limited distribution of a species, rarity throughout a wide distribution, particular sensitivity to environmental effects, or a combination of these and other factors.

Special-interest plant or animal species include:

- BLM Sensitive Species. The BLM maintains a list of "sensitive species" which generally includes federal Category 1 and 2 species, as well as other protected species (such as the state protected bighorn sheep).

- Plants occurring on Lists 1A, 1B, 2, 3, and 4 of the *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California* (Smith and Berg, 1988).

- Animals designated "Species of Special Concern" by the CDFG and listed on the Natural Diversity Data Base (NDDB) (Remsen, 1978; Williams, 1986; CNDDB, 1991).

- Game species, are considered here as special-interest species because of their economic and recreational value.

4.1.3.2 Thresholds of Significance

Based upon NEPA and CEQA guidelines and commonly accepted criteria, an impact would be determined significant if it could:

- Substantially diminish habitat for a plant or animal species.
- Substantially affect a threatened, or endangered, species, special-interest species, or its habitat.
- Interfere substantially with the movement of a resident or migratory wildlife species.

The significance of potential impacts to vegetation and wildlife are evaluated based upon sensitivity of the resource and the extent of the impact. Highly sensitive resources (such as a threatened or endangered species) may be able to absorb only a limited degree of impact. Conversely, resources determined to have a low sensitivity (e.g., common or widely distributed species, or species that may be declining elsewhere but have a large, locally stable population) may be able to sustain a relatively large impact or population loss and not be significantly affected.

"Incidental take" refers to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by a federal agency or applicant (50 CFR §402.02). Some impacts associated with large construction projects can be considered incidental takings. Take is defined as an action that would "harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 U.S.C. §1538 [1973]). Take has also been defined through case law as an adverse modification of habitat. Habitats falling within any of the three categories for desert tortoise (*Gopherus agassizii*) management as defined by BLM are considered important resources. Impacts to tortoises and their habitat are evaluated according to the above criteria. Incidental take of federally threatened or endangered species is authorized by the Secretary of the Interior through the Section 7 consultation process.

Biological impacts are not considered significant if the resource is not considered important or sensitive according to the above criteria, or if the extent of impact on the species or its habitat is limited.

4.1.3.3 Impacts of the Proposed Action

The proposed mine expansion is located immediately adjacent to an area that has been heavily affected by mining activities from the existing Mesquite Mine. As detailed in Table 2.1-1, proposed modified facilities comprise approximately 693 acres. Of this, 171 acres were previously disturbed by prior ancillary activities, leaving a balance of 522 acres. However, only 189 acres of this are unpermitted, while 421 acres comprise uncompensated desert tortoise habitat. The impacts of these expansions are considered in the discussion of on-site impacts.

Vegetation

The three native plant communities in the project area, desert microphyll woodland, upland succulent and creosote bush scrub, are the habitat types that would be directly impacted (see Figure 3.3-1). The proposed expansion would result in a direct loss of approximately 380 acres of cresosote/desert pavement habitat, approximately 67 acres of microphyll woodland habitat, and approximately 45 acres of upland succulent habitat. Another 15 acres of microphyll woodland would be cut off from upstream water sources south of the proposed North Diversion Channel. Blue palo verde (*Cercidium floridum*) and desert ironwood (*Olneya tesota*), associated with these three plant communities would also be impacted. Suitable habitat for ribbed cryptantha and winged cryptantha was observed throughout the proposed project area, though no individuals for these species were observed. Of these three habitat communities, microphyll woodland is considered the most sensitive because it provides potential habitat for several sensitive bird, reptile and mammal species.

Based on the revegetation approach described in Sec. 2.1.7 that utilizes no supplemental irrigation except for transplanted trees or shrubs, no significant problem with growth of invasive exotic plant species in reclaimed areas is anticipated. It is possible that tamarisk trees may persist for some time in areas having high moisture. If this occurs, selective spraying of the tamarisks with an approved herbicide such as Roundup and/or Garlon will be considered, if necessary, subject all applicable regulations and to BLM approval.

Microphyll Woodland

To characterize impacts to this habitat, microphyll woodland was defined as the consisting of one or more individuals of desert ironwood, blue palo verde, and or smoke tree spaced within 100 meters of each other. Within the areas proposed for mine expansion, a total of approximately 82 acres of microphyll woodland are present.

Of the approximately 82 acres of proposed impact to microphyll woodland, approximately 23 acres (heap leach pad expansion, Section 16) are already permitted and compensated for in accordance with previous environmental mitigation. Therefore, the proposed action will result in a net impact of approximately 59 acres of microphyll woodland (44 acres direct impact, 15 acres indirect). Impacts to this 59 acres of microphyll woodland habitat would be significant. Table 4.1.3-1 shows impacts to microphyll woodland for each proposed expansion areas.

Microphyll woodland is considered by CDFG to be one indicator of CDFG jurisdictional streambeds under Section 1600 of the Fish and Game Code. The other indicator on-site is desert washes, which are considered jurisdictional waters by the U. S. Army Corps of Engineers (See Section 3.2, Water). The total area of CDFG jurisdictional streambeds (microphyll woodland + desert washes – overlap) within the unpermitted expansion areas is approximately 25.36 acres while there are approximately 39.92 acres in areas previously permitted for Mine disturbance. Figure 4.1.2-3 shows the proposed Plan of Operations boundary and mapped microphyll woodland areas and Waters of the U.S. Table 4.1.3-2 details CDFG jurisdictional components by expansion area.

Table 4.1.3-1

Proposed Action Impacts to Microphyll Woodland, by Expansion Area

Proposed Expansion Area	Impacts to Microphyll Woodland (Acres)	
	Direct	**Indirect**
North Extension (unpermitted)	8 acres	0 acres
North Drainage Diversion (unpermitted)	7 acres	15 acres cut off from upstream water due to diversion
East Rainbow North Overburden/Interburden		
Previously Permitted by BLM/Imperial Co.	1 acres	0
Not Permitted	0 acres	0
Total	1 acres	0
East Rainbow Drainage Diversion		
Previously Permitted by BLM/Imperial Co.	6 acres	0
Not Permitted	1 acres	0
Total	7 acres	0
East Rainbow Extension		
Previously Permitted by BLM/Imperial Co.	5 acres	0
Not Permitted	4 acres	0
Total	9 acres	0
East Rainbow South Overburden/Interburden		
Previously Permitted by BLM/Imperial Co.	12 acres	0
Not Permitted	0 acres	0
Total	12 acres	0
Leach Expansion (Previously Permitted by BLM/Imperial Co.)	23 acres (a)	0
Total Impacts, by type	**67 acres**	**15 acres**
Total Direct and Indirect Impacts	**82 acres**	
Acreage not prev. compensated for, by type	44 acres	15 acres
Total acreage not previously compensated for	**59 acres**	
Acreage requiring mitigation, per BLM (b)	20 acres	15 acres
Total acreage requiring mitigation, per BLM	**35 acres**	

Sources: NECI, 2000; BRG Consulting, 2000.

Notes: All values rounded to nearest integer.
(a) All of Section 16 was permitted, and impacts were compensated.
(b) BLM has determined that only impacts to microphyll woodland that were not previously permitted will be required to be mitigated.

Table 4.1.3-2

Waters of the U.S. and Microphyll Woodland, in Acres, by Expansion Area, Proposed Action, Mesquite Mine Expansion

Proposed Action	Waters of U.S.		Microphyll Woodland		Overlap (a)		Total CDFG Jurisdiction (b)	
Expansion Area	**Prev. Permitted**	**Not Permitted**	**Prev. Permitted**	**Not Permitted**	**Prev. Permitted**	**Not Permitted**	**Prev. Permitted**	**Not Permitted**
North Exten., Big Chief Pit	0	1.84	0	8	0	1.68	0	8.14
Big Chief Pit S/SE Exten. (c)	0	0	0	0	0	0	0	0
East Rainbow Pit Extension	3.68	0.7	5	4	0.02	0.08	8.66	4.62
Big Chief West OISA	0	0	0	0	0	0	0	0
East Rainbow North OISA	1.7(d)	0	1	0	0	0	2.7	0
East Rainbow South OISA	8.25	3.48 (d)	12	0	0	0	20.25	3.48
E. Rainbow Diversion Channel	2.3	0.24	6	1	0.04	0.04	8.26	1.2
North Extension Diversion Channel	0	2.78	0	7	0	2	0	7.78
Heap Leach Pad No. 6 Expansion (e)	NA	NA	NA	NA	NA	NA	NA	NA
TOTALS	**15.93**	**9.04**	**24**	**20**	**0.06**	**3.8**	**39.87**	**25.24**
TOTALS	**24.97**		**44**		**3.86**		**65.11**	

Sources: Jones & Stokes, 1999 and 2000; NECI, 2000; BRG Consulting, 2000

(a) Areas where microphyll woodland is found in drainages meeting ACOE definitions for jurisdictional waters
(b) The sum of estimated acres of waters of the U.S. plus microphyll woodland acres, less the area of overlap.
(c) The area was previously disturbed by ancillary mining activities
(d) Extrapolated by BRG from Jones & Stokes data
(e) All of Section 16 was previously permitted for heap leach pad disturbance, and compensated

The vegetated areas that would be disturbed by the project represent a very small percentage of similar vegetation communities that occur in the project vicinity and in the Colorado Desert as a whole. As such, the project area is not considered a significant portion of the available plant community. Undisturbed adjacent areas throughout the region provide similar habitat for plant species. Because the proposed project would be located in plant communities that are widely distributed, it would not significantly reduce the overall species diversity or population of any plant species within the Colorado Desert.

Blue palo verde and desert ironwood would also incur impacts from the Proposed Action. These plants are classified as regulated state plants and are protected by state law. However, this law was designed to regulate harvest of plants for nursery and other purposes and does not apply to land clearing or other development activities. Individual plants that are suitable for transplantation will be removed and transplanted prior to surface disturbance activities, as described in Section 2.1.7. Therefore, impacts would not be significant.

Based upon the types of vegetation communities and species represented, and the location of the project site in the context of the Colorado Desert, proposed activities at the mine would not result in significant impacts to: (1) vegetative communities restricted in distribution, (2) core habitats, or (3) buffer zones. However, the loss of 59 acres (net) of microphyll woodland from the proposed expansion would reduce available habitat for protected or sensitive desert species, most notably resident and migrant bird species and mule deer.

Wildlife

Construction would affect the habitat of many common species of desert animals that are found in this region, as well as a few sensitive or protected species that use the area. Resident reptiles, including the desert tortoise, would be displaced from the site. On-site habitat would be lost or reduced for resident birds. Microphyll woodland habitat (59 acres) used by wintering and migrating birds for cover, forage, and nesting sites would be lost or reduced. The loss of habitat for migrant birds in the lower Colorado River Valley has created a need to maintain peripheral habitats for bird breeding and wintering. The habitat in the project area is a small part of a large but lesser-quality, bird-breeding and wintering habitat resource provided by the Colorado Desert. Because vegetation in the project area is sparse, and the surrounding area is virtually undeveloped and has similar habitat, the loss of 59 acres of microphyll woodland habitat as a bird-breeding and wintering area would not be considered a significant impact.

Mammals, such as the mule deer (*Odocoileus hemionus*) visit the site to browse. The proposed mine expansion would decrease available foraging area for these mammal species on a regional basis. However, the surrounding area is virtually undeveloped and would not be affected by the proposed mine expansion. Therefore, there would be no overall effect on the ecological systems that support mammals that are indigenous to the area and impacts would not be significant. Smaller mammals, reptiles, and amphibians (i.e. wildlife with small home ranges and reduced mobility) would be affected the most due to their inability to relocate off site. Because these species are regionally abundant, their displacement would not significantly impact the regional ecosystem.

Equipment operation and human presence would be expected to further affect wildlife. Direct mortality could occur to resident animals in burrows or nests destroyed by heavy equipment. Animals that would move (or be moved) off the site could indirectly affect animals in adjoining habitat by inducing temporary population stress. Daily operations could impact species sensitive to high noise levels. Noise and the presence of humans associated with project operations may discourage the presence of the larger mammals such as the mule deer and bighorn sheep, as well as the larger predators such as the coyote (*Canis latrans*).

Surface disturbances and habitat loss as a result of project construction would not be expected to significantly affect wildlife populations due to the availability of adjacent large habitat areas. In addition, compensation lands primarily provided to offset loss of desert tortoise habitat, would also benefit other species.

The proposed expansion would not be expected to significantly interrupt wildlife movement patterns or result in additional habitat fragmentation (the local habitat is already fragmented by the existing Mesquite Mine and SR 78) because wildlife would be able to move around the proposed project area to get to the other side. The project site is not known to provide significant habitat for animal species of restricted distribution, or to provide core habitat for any species. Impacts would not be significant.

Ecological Risk Assessment

An ecological risk assessment was conducted by Samuel Bamberg and Shepherd-Miller, Inc. (2000) relative to current and predicted future pit lake water quality at the Mesquite Mine site. The two proposed alternatives examined were that of open pits (the Proposed Project/Action or Reduced Footprint Alternative) or that of total backfill, where all the new overburden/interburden would be placed in the pits (the IOISA Option Alternative). Potential risks were evaluated only for those resident or migratory species (receptors) that would be present at the site, in the absence of mining activities. Aquatic invertebrates and wetland plants were excluded from the study because they would only exist at the site because of the presence of the pit lakes. Six receptors were studied: plant-feeding waterfowl, invertebrate-feeding waterfowl, raptors, mice, rabbits, deer and coyotes. These six receptors provide coverage of site species and major food chains that could potentially be affected by the presence of the pit lakes.

For each receptor, the study evaluated both drinking water and dietary ingestion pathways. Pit lake water quality data from 1997-1999 was used to calculate acute and chronic levels of each chemical of concern (COC) for initial (current) conditions for drinking water intake for each receptor species. The study used predicted water quality data to evaluate future ecological risks through the drinking water pathway.

The aquatic dietary pathway follows transfer of COCs from water through algae and invertebrates to waterfowl. The terrestrial dietary pathway evaluates transfer of COCs from the pit lake water through vegetation to herbivores and carnivores. Risks through the dietary pathway under current conditions were not evaluated because there has been only minimal development of the aquatic and

terrestrial communities, and these will probably be short-lived until mining activities are completed. In addition, the development and extent of these communities will be highly dependent on the final pit configuration. If the final water elevations intersect steep pit walls, very little development of plant communities along the shorelines would be expected. The presence or absence of substantial vegetation communities affects both the potential transfer of COCs in food chains, as well as providing or limiting available habitat for site herbivores. In the study, the authors developed conceptual models of potential development of aquatic and terrestrial communities under post-mining conditions. These communities were then used as the basis for the risk assessment through dietary pathways.

Safe dietary concentration and bioconcentration factor (BCF) values were obtained from the literature on this topic, and used to back-calculate safe water concentrations in the pit lakes, for both open pit and partial backfill alternatives. These safe water concentrations were then compared to predicted concentrations to determine if there was the potential for significant risk to any of the receptor species. A conservative approach was use in selection of these values in order to provide an additional measure of safety in the overall assessment.

The study concluded that currently there is no significant risk to site receptors from the drinking water pathway and existing water quality. However, four COCs present the potential for significant ecological risks to migratory and resident animal populations under predicted future water quality conditions. These four COCs are boron, fluoride, selenium and silver. Although all four present significant ecological risk potential under both open pit and partial backfill alternatives, the risks associated with the partial backfill option are much greater. A further discussion of the risks posed by these four COCs in the drinking water and dietary pathways is provided below.

Drinking Water Pathway

- The predicted future concentrations of boron in both the open pit and total backfill options indicate a potential risk to birds, deer and coyote receptors. This conclusion is based upon the exceedance of the literature-derived safe level of 5 ppm. However, none of the predicted concentrations exceed the safe drinking water values listed by Oak Ridge National Laboratory (ORNL), suggesting that the overall risk is likely low.

- The predicted future selenium concentrations in the Big Chief South pit lake, under the total backfill option, slightly exceeds the safe drinking water level for birds and mammals. No other exceedances of safe levels under either option was predicted.

- Predicted future silver concentrations only exceed the safe drinking water level for birds and mammals under the partial backfill option (at Big Chief South pit lake).

- Predicted concentrations of fluoride in many of the pit lakes under the partial backfill option exceed the literature-based safe drinking water level. However, all of the predicted

concentrations are well below the concentrations listed by ORNL as safe for birds and mammals, suggesting that the risk from fluoride in drinking water is likely low.

- Increasing salinity of pit lake waters as a result of evaporation will likely preclude significant use of these lakes as drinking water sources due to their water's unpalatability.

Dietary Exposure Pathway

- Under the open pit option, deer and coyotes might be at risk from boron transfer through dietary food chains. Under the partial backfill option, mice, rabbits, deer, coyotes, and raptors have a risk potential from dietary boron exposure.

- Predicted selenium levels in pit lake water under both the open pit and partial backfill options are likely to present a risk to mice, rabbits and deer through dietary exposure. Coyotes are potentially at risk under the partial backfill option, but not for the open pit option. Similarly, the open pit option is unlikely to present a risk to waterfowl or raptors, though the potential for risk increases substantially under the partial backfill option for these receptors.

- Predicted silver concentrations in the pit lakes presents a potential dietary risk to raptors, mice, rabbits and deer under both options. Waterfowl that consume invertebrates under the partial backfill option may also be at risk. Predicted risk from dietary exposure to silver, however, is based on limited literature regarding safe levels and transfer factors. Furthermore, silver has not been detected in the pit lakes or groundwater, so the predicted future concentrations are quite uncertain because they are based on 50% of the current non-detect values.

- Predicted fluoride concentrations in the pit lakes do not represent a risk to waterfowl or raptors under either option. However, deer and coyotes have potential dietary risk associated with fluoride under both mine options, whereas mice and rabbits are only at risk under partial backfill.

In summary, four COCs (boron, selenium, silver and fluoride) present potential future risk to site receptors from the drinking water exposure pathway, particularly with the total backfill option. However, due to predicted high salinity of the lakes as a result of evaporation, only limited use of the waters for drinking is expected. The more critical potential exposure pathway is through dietary exposure from vegetation that could colonize the edges of the lakes.

Since the principal route of exposure and potential risk to site biota is through the dietary pathway, limiting the development of vegetation within the pit lake basins would minimize the potential for risk, since it would largely preclude uptake of COCs into vegetation, and thus the subsequent transfers to site receptors. In addition, preventing the development of any substantial vegetation communities along the pit lake edges would also reduce the available habitat for terrestrial biota, further limiting the risk potential. An effective mitigation of potential risk could be accomplished

by constructing the pits such that the pit walls at, immediately above, and immediately below the permanent water line are too steep to allow for successful colonization of plants.

Threatened and Endangered Species

This section discusses impacts to the desert tortoise, the only federal or state listed endangered or threatened wildlife species observed or expected to occur on-site. There are no federal or state listed endangered or threatened plant species observed or expected to occur on-site.

Desert Tortoise (USFWS: Threatened; CDFG: Threatened; BLM Sensitive Species)

Desert tortoise surveys were conducted on April 14-16, 1999 and June 1, 2000 within all of the proposed expansion areas (See Section 3.3). Based on the field surveys, a total of 4 tortoises, 8 pallets and 59 burrows were observed throughout the proposed expansion areas (See Figure 3.3-2).

Another survey was conducted on April 16 and September 2, 1999 along SR 78, where it runs adjacent to and parallel with the mine property line, found no signs of tortoises, either individuals or signs of burrowing under the fence. The majority of the fence has a protective berm of soil heaped along the inside, which appears to serve as a deterrent to burrowing. Also, no sensitive plant species were observed during the survey. During the interim months, no signs of tortoise fatalities or activity were observed along this section of SR 78 by NECI or Mesquite Mine personnel. However, an adult tortoise has been repeatedly sighted by mine personnel in the area of the proposed North Extension. This individual was not observed during the tortoise surveys but may still be utilizing this area as part of its home range.

Approximately 693 acres of desert tortoise habitat (BLM Category II and III) will be disturbed as a result of the proposed expansion. The loss of this 693 acres of potential habitat from the proposed mine expansion would represent a significant direct impact on the desert tortoise. However, approximately 272 acres are currently compensated for, or were disturbed prior to the listing of the desert tortoise. All of the acres in Section 16 are permitted and have been compensated for under Biological Opinion (1-6-92-F-22). Therefore all of the acreage in Section 16 have already been compensated for and no additional impacts are anticipated. A total of 421.6 acres of impacts to tortoise have not been compensated, and would be new impacts associated with implementation of the Proposed Project/Action. Biologists from NECI conducted tortoise surveys on all of the proposed expansion areas utilizing methodologies currently acceptable to USFWS. The results of the Tortoise Surveys of April 14 -16, 1999 and June 1, 2000 are found in the NECI Biological Report (2000).

Impacts to desert tortoises and desert tortoise habitat on the property are considered to be low since population density is low; however, some "take" may occur from the loss of potential habitat. Because the desert tortoise is a Federally threatened, as well as state listed species, any potential take would require consultation with USFWS under Section 7 of the Federal Endangered Species Act, and contact with CDFG under CESA.

Mitigation measures typically require relocating desert tortoises inhabiting impact zones. Secondary impacts to the relocated tortoises could occur as a result of potential stresses associated with relocation (mostly, but not limited to, lack of knowledge of cover sites, nest sites, and foraging areas). Established tortoises in the recipient population could potentially be affected by competition for foraging land and increased antagonistic social interactions. The degree to which these factors would occur and affect the success of relocation are not well understood. Impacts would also include temporary disruption of the vertebrate community structure, including predator/prey relationships, adjacent to the site.

The project design incorporates several mitigation measures designed to reduce impacts to the tortoise. Specific mitigation measures to be utilized will be determined as part of the Section 7 consultation process. While some impacts (such as habitat loss) would be unavoidable at the site, the established mitigation measure of compensating for such habitat loss through the acquisition and transfer to federal ownership of higher quality habitat would be implemented. The level of such habitat compensation would be determined by the BLM in consultation with the USFWS . For the mine expansion to be constructed, these agencies would have to be satisfied that the mitigation measures for the tortoise were adequate so as to prevent the project from jeopardizing the continued existence of the tortoise.

Other Special-Interest Species

Species recognized as sensitive by scientists, conservationists or agencies do occur on or near the project site. As described above, special-interest plant or animal species include: animals designated as “Species of Concern” by the USFWS (FSOC); BLM Sensitive Species (BLM SS); plants occurring on Lists 1A, 1B, 2, 3, and 4 of the *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California (CNPS);* animals designated as “Species of Concern” (CSOC) or "Species of Special Concern" (CSOSC) by the CDFG and listed on the Natural Diversity Data Base (NDDB); and, California game species (CGS), because of their economic and recreational value.

Plants

Fairy Duster CDFG NDDB; CNPS #2

The fairy duster *(Calliandra eriophylla*) was found on three of the proposed expansion areas totaling approximately 223 acres. Fewer than 20 individuals were found in the proposed “East Rainbow North Overburden/Interburden Area.” In addition, 5-10 individuals were observed within the proposed “East Rainbow Extension”, and fewer than 23 individuals were observed within the proposed “Leach Expansion Area”. Impacts to fairy dusters in the proposed expansion areas would be significant.

Slender-lobed 4 O’clock flower; CNPS#4

No individuals of slender-lobed 4 o’clock flower *(Mirabilis tenuiloba)* were observed during the survey period. However, suitable habitat does exist within the proposed “East Rainbow South Overburden/Interburden Area” in the large sandy wash that follows the base of the existing waste piles

(approximately 10 acres). The loss of potential habitat for this species from the proposed mine expansion would be significant.

Winged Cryptantha; CNPS#4

No individuals of winged cryptantha (*Cryptantha holoptera)* were observed during the survey period. However, suitable habitat was observed throughout the proposed project area. The loss of potential habitat for this species from the proposed mine expansion would be significant.

Ribbed Cryptantha; CNPS#4

No individuals of ribbed cryptantha *(Cryptantha costata)* for this species were observed during the survey period. However, suitable habitat was observed throughout the proposed project area. The loss of potential habitat for this species from the proposed mine expansion would be significant.

Mammals

Mule Deer; CGS

Scat and tracks from mule deer (*Odocoileus hemionus)* were observed within all of the washes in the proposed project area. Approximately 59 acres (net) acres of microphyll woodland will be disturbed as a result of the proposed expansion. However, the proposed expansion areas do not contain any unique or abundant resources as compared to adjacent lands. The development of the proposed mine expansion would decrease available foraging area on a regional basis. However, the surrounding area is virtually undeveloped and would not be affected by the proposed mine expansion. Therefore, there would be no overall effect on the ecological systems that support mule deer and impacts would not be significant.

Animals may be attracted to uncovered water sources and attempt to drink, particularly during the hot, dry months of summer. However, during mine operations there is no open water that may attract wildlife. All solution ponds and channels are covered. No water is allowed to accumulate in the mine pits – that would interfere with the mining operation. An uncovered and dry "overflow pond" is part of the mine facilities, designed to capture runoff from precipitation events that exceed the 100-year storm. Such events are by definition rare, and animals would have alternative water sources available if such an event occurred. Therefore, there is no impact. Possible impacts associated with mine lakes following completion of mining are addressed in the ecological risk assessment, by Bamberg and Shepherd-Miller, Inc. (2000).

Bighorn Sheep; BLM Sensitive Species; CDFG Game Species

Bighorn sheep (*Ovis canadensis*) have not been observed within the area of the mine but have been observed in the vicinity. Approximately 59 acres (net) acres of microphyll woodland will be disturbed by the proposed expansion. However, the proposed expansion areas do not contain any unique or abundant resources as compared to adjacent lands. The development of the proposed mine expansion would decrease available foraging area on a regional basis. However, the surrounding area is virtually undeveloped and would not be affected by the proposed mine expansion. In addition, no

individuals or sign were observed on the proposed expansion areas and no bighorn sheep have been observed on the property by mine personnel since mining started in 1984. Therefore, there would be no overall effect on the ecological systems that support bighorn sheep and impacts would not be significant.

Bat Species

Suitable roosting habitat was not present within any of the proposed expansion areas, however all of the areas are considered to be suitable as foraging habitat. Three known/potential roosting sites were identified in the region.

There is microphyll woodland between bat-occupied mines and Mesquite Mine, and these woodlands are probably used more heavily than the woodlands on the Mesquite Mine property. According to Dr. Brown-Berry (personal communication 8/16/99) the bats would use a closer source of food than a further one to save energy and time.

California Leaf-Nosed Bat; FSOC/CSOC/BLM SS

The entire project area was identified as potential foraging habitat for the California leaf-nosed bat (*Macrotus californicus*). Only one known roost site for this species occurs within three miles of the Mesquite Mine. There is microphyll woodland between bat-occupied mines and Mesquite Mine, and these woodlands are probably used more heavily than the woodlands on the Mesquite Mine property. According to Dr. Brown-Berry (Personal Communication, 1999) the bats would use a closer source of food than a further one to save energy and time. Therefore, development of the proposed mine expansion would not have a significant impact on the California leaf-nosed bat.

Greater Western Mastiff Bat; BLM SS

The entire project area was identified as potential foraging habitat for the greater western mastiff bat (*Eumops perotis*). There are no known roosting sites for this species in the vicinity of the Mesquite Mine. Therefore, development of the proposed mine expansion would not have a significant impact on the greater western mastiff bat.

Southwestern Cave Myotis; BLM SS

The entire project area was identified as potential foraging habitat for the southwestern cave myotis (*Myotis velifer brevis*). There are no known roosting sites for this species in the vicinity of the Mesquite Mine. Therefore, development of the proposed mine expansion would not have a significant impact on the southwestern cave myotis.

Small-footed Myotis; BLM SS/ FSOC

The entire project area was identified as potential foraging habitat for the small-footed myotis (*Myotis ciliolabrum*). There are no known roosting sites for this species in the vicinity of the Mesquite Mine. Therefore, development of the proposed mine expansion would not have a significant impact on the small-footed myotis.

Desert Pallid Bat; CSOSC/BLM SS

The entire project area was identified as potential foraging habitat for the desert pallid bat (*Antrozous pallidus pallidus*). Pallid bats are known to occur in small roosts of 10-20 individuals in natural caves and crevices. There are two known roosts of pallid bats located within 6 miles of Mesquite Mine. Other possible roosts, if they exist in the adjacent mountains near the mine, could incur impacts from loss of microphyll woodland foraging areas. However, significant impacts to pallid bats from the proposed mine expansion is considered unlikely, due to 1) the wide range of pallid bats (British Columbia to central Mexico) and 2) pallid bat versatility in roosting site choices, and ability to relocate their roosts. Therefore, development of the proposed mine expansion would not have a significant impact on the desert pallid bat.

Spotted Bat; FSOC/CSOC/ BLM SS

The entire project area was identified as potential foraging habitat for the spotted bat(*Euderma maculatum*). Known roosting sites for the spotted bat in the vicinity of the Mesquite Mine area are more than two miles away. Therefore, development of the proposed mine expansion would not have a significant impact on the spotted bat.

Townsend's Big-Eared Bat; CSOC

Townsend's big-eared bat (*Corynorhinus townsendii*) is a medium-size bat with buffy-brown fur distinguished by two-pronged, horseshoe-shaped lumps on the rostrum. These bats occur in a wide range of habitats in deserts. They prefer cave-like roosting habitat. Population concentrations occur in areas having substantial surface exposure of cavity-forming rock, such as limestone, sandstone, gypsum, or volcanics. This species also uses old mining districts and buildings having cave-like features. Maternity colonies vary from a dozen to several hundred animals. Their diet is primarily lepidopteran, usually medium-sized moths. The proximity of good foraging habitat appears to be a determining factor in roost selection. They usually forage within three miles of their roosts. This species is known from one roost in the Chocolate Mountains. Suitable foraging habitat for this bat is present within the proposed expansion areas. However, no known roosts are located in close proximity to Mesquite Mine. Therefore, development of the proposed mine expansion would not have a significant impact upon Townsend's big-eared bat.

Birds

Avian species of special concern are also known to occur on-site or in the project area. These species include Le Conte's thrasher, the burrowing owl and the prairie falcon. The loss of 522 acres of habitat (190 acres unpermitted) for these species would not be significant given the availability of large-quantities of similar habitat in the Colorado Desert and the exchange and compensation that would occur to obtain use of the on-site BLM-managed lands.

Burrowing Owl; CSOSC

Suitable habitat for the burrowing owl (*Athene cunicularia*) is present within the proposed expansion areas. However, no individuals or burrows were observed within the proposed expansion areas. Based on the fact that the habitat found within the proposed expansion areas does not exhibit any unique characteristics and is a small percentage of the available habitat surrounding the Mesquite Mine, no significant impacts to burrowing owls are anticipated.

LaConte's Thrasher; CSOSC

Surveys for LeConte's thrasher (*Toxostoma lecontei*) were conducted on April 10th, 13th and 16th 1999 along the proposed East Rainbow Extension (See NECI Biological Report, 2000). The washes within the proposed project area were only marginally suitable for LeConte's thrasher (*Toxostoma lecontei*). Only marginal habitat was identified along the northeast portion of the mine expansion, and no individuals were observed during the field surveys. No impacts to LaConte's thrasher are expected.

Prairie Falcon; CSOC

The entire project area was identified as potential foraging habitat for the Prairie Falcon (*Falco mexicanus*) because there are nests in the Chocolate Mountains. These nests or aeries are less then 50 miles away, putting the mine within the known foraging range of nesting pairs. However, no potential roost sites were observed within the proposed expansion areas. Impacts to this species would be less than significant.

Amphibians

Couch's Spadefoot Toad; FSOC/CSOS/ BLM SS

A population of Couch's spadefoot toad *(Scaphiopus couchii)* lives in an area adjacent to the Algodones Dunes and along SR 78. The Couch's spadefoot toad was not observed within the proposed expansion areas. During surveys for tortoise and thrashers (April 12-16, 1999) no areas exhibiting characteristics associated with pooling or ponding of water for 7 to 10 days were observed in the proposed expansion areas. Characteristics evaluated included soil staining, build up of organic material, and desiccation cracks in soil within depressions along the washes. In addition, working mine areas would be bermed to prevent surface flows from increasing downstream sediment flows. For these reasons, impacts to the referenced Couch's spadefoot toad population at the Algodones Dunes would not be significant.

Reptiles

Western Chuckwalla; FSOC/BLM SS

Less than 3 acres of habitat for the western chuckwalla *(Sauromalus obesus)* was observed within the proposed "North Extension" and the proposed East Rainbow North Overburden/Interburden Extension" area. No individuals were observed during the survey but, based on past observations of

chuckwalla in the vicinity, it is possible that a population exists within the proposed project area. Impacts to this species would not be significant, based on the thousands of acres of such habitat that is available in the general vicinity of the Proposed Project.

Proposed Expansion Areas

Table 4.1.3-3 qualitatively summarizes impacts for each proposed expansion area. Both significant and non-significant impacts prior to mitigation are included in this table. However, all impacts are mitigated to a level less than significant as a result of the proposed mitigation measures, discussed in Section 4.1.3.4.

4.1.3.4 Mitigation Measures

This section presents mitigation measures for plant and animal communities within the Proposed Action area of influence. Special emphasis is placed on species listed as threatened or endangered, having the potential to be affected by the Proposed Action. The primary species of concern that would be affected by the Proposed Action is the desert tortoise. Mitigation for this and others potentially affected sensitive species are described in this section.

During the life of the project, the construction, maintenance, and other activities that have the potential to impact sensitive species will undergo environmental review by a qualified biologist and appropriate agencies. Through mitigation monitoring, the effectiveness of mitigation measures shall be evaluated throughout the life of the facility and may be modified, based on new information and/or new technology. Significant changes to project design, or activities that may affect a listed species and which effects were not considered during the Section 7 consultation, will require re-initiation of applicable Endangered Species Act consultation. Additionally, if new information becomes available on listed species or impacts to listed species, or if the incidental take limit is exceeded, re-initiation of applicable Endangered Species Act consultation will also be required.

The mitigation measures presented in this section include those utilized for other similar actions at the Mesquite Mine in the past. These measures were derived from a Biological Opinion (1-6-98-F-39) on the “Proposed Mesquite Mine Exploratory Drilling Project, Imperial County, California" (July 7, 1998); a Biological Opinion (1-6-97-F-34) titled "The Proposed Gunnery Range Land Exchange, Chocolate Mountains, Imperial County, California"(April 14, 1997); a Biological Opinion (1-6-92-F-28) for “Small Mining and Exploration Operations in the California Desert" (June 1, 1992); and a Biological Opinion (1-6-92-F-22) for the “Continued Operations of Gold Fields Operating Company’s Mesquite Mine” (March 26, 1992).

General Mitigation Measures

1. At the end of the project, disturbed areas, including new access roads, should be re-contoured and re-seeded with an appropriate mixture of native plant species according to the Reclamation Plan. All desert tortoise-proof fences should be removed also according to the Reclamation Plan.

Table 4.1.3-3
Summary of Proposed Action Biological Impacts By Proposed Expansion Area

Proposed Expansion Area	Vegetation Impacts	Wildlife Impacts
North Extension Area Big Chief	Loss of habitat for ribbed cryptantha, and winged cryptantha,	Loss of habitat for desert tortoise, western chuckwalla (ns), bighorn sheep (ns), and foraging habitat for the prairie falcon (ns).
North Drainage Diversion	Loss of habitat for the fairy duster, ribbed cryptantha, winged cryptantha,	Loss of habitat for desert tortoise, mule deer (ns), bighorn sheep (ns), burrowing owl (ns), and foraging habitat for the prairie falcon (ns).
Big Chief West OISA	Loss of habitat for the ribbed cryptantha and winged cryptantha	Loss of habitat for desert tortoise and western chuckwalla (ns), and foraging habitat for the prairie falcon (ns).
East Rainbow North OISA (previously permitted)	Loss > 20 individuals of fairy duster Loss of habitat for the ribbed cryptantha and winged cryptantha	Loss of habitat for desert tortoise, mule deer (ns), bighorn sheep (ns), burrowing owl (ns), and foraging habitat for the prairie falcon (ns).
East Drainage Diversion	Loss of habitat for the fairy duster, ribbed cryptantha and winged cryptantha,	Displacement of one desert tortoise. Loss of habitat for the desert tortoise, mule deer (ns), bighorn sheep (ns), burrowing owl (ns), and foraging habitat for the prairie falcon (ns).
East Rainbow Extension	Loss of approximately 5-10 individuals of fairy duster Loss of habitat for the ribbed cryptantha and winged cryptantha	Displacement of one desert tortoise. Loss of habitat for the desert tortoise, mule deer (ns), bighorn sheep (ns), burrowing owl (ns), and foraging habitat for the prairie falcon (ns).
East Rainbow South OISA	Loss of habitat for the fairy duster, ribbed cryptantha, winged cryptantha, and slender lobed 4 o'clock flower,	Displacement of one desert tortoise. Loss of habitat for the desert tortoise, mule deer (ns), bighorn sheep (ns), burrowing owl (ns), and foraging habitat for the prairie falcon (ns).
Leach Expansion (previously permitted and compensated)	Loss of > 23 individuals of fairy duster Loss of habitat for the ribbed cryptantha and winged cryptantha	Displacement of one desert tortoise. Loss of habitat for desert tortoise, mule deer (ns), bighorn sheep (ns), burrowing owl (ns), and foraging habitat for the prairie falcon (ns).

Source: NECI (ns) = impact less than significant

2. Access should be confined to approved routes to reduce impacts brought about by road proliferation.

3. All bladed vegetation and excavated materials should be stockpiled in such a manner that they do not obstruct the natural flow of water down wash systems.

4. Destruction of vegetation, particularly cacti and patches of herbaceous plants, shall be avoided whenever possible.

5. All compacted soil (except desert pavement) shall be scarified upon completion of mining activities. This may be done by using rippers, discs, rakes or other appropriate equipment.

6. Storage of equipment, supply material, ores or any residue of the mining operation shall be accomplished in a manner, which minimizes surface disturbance.As identified in the Revised POO, and to the extent practicable, all pits should be backfilled.

7. Impacts to CDFG jurisdictional streambed shall be mitigated at a 3:1 ratio, in accordance with permits issued by CDFG under Section 1600 et seq. of the Fish and Game Code.

8. Impacts to waters of the U.S., and associated microphyll woodland habitat, will be mitigated through 1) preservation of at least 3 times the acreage of such habitat (3:1 mitigation ratio) within the desert tortoise compensation area described below, and 2) through revegetation of microphyll woodland habitat along 3.8 miles of drainage diversions within the mine. The actual amount of waters and microphyll preserved is dependent on the alternative approved and the specific compensation lands chosen.

9. Newmont staff members or qualified biological consultants will conduct a reconnaissance for potential sensitive species in areas proposed for disturbance in the wet season prior to that disturbance.

10. Mine pit walls within twenty feet above and below the projected long-term water levels will be designed to be as steep as possible, to minimize the development of vegetation that could serve as dietary pathways for ingestion of harmful compounds by birds and animals.

Species-Specific Impacts

Desert Tortoise

The following reasonable and prudent measures are proposed as necessary and appropriate to minimize the impacts of incidental take of desert tortoise:

1. On-site biological supervision/monitoring, along with clearance surveys and relocation efforts, shall be utilized to reduce the likelihood of harm/harassment to the desert tortoise.

2. Employee education programs, designated work areas, defined operational procedures, reclamation efforts, and a Microphyll Woodlands assessment shall minimize the impact of mine-related operations on both the desert tortoise and the species' associated habitat.

To be exempt from the prohibitions of Section 9 of the Act, compliance must meet with the following terms and conditions. These implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Compensation for loss of habitat is necessary according to BLM requirements. Current requirements are based on a formula presented in Recommendations for Management of the Desert Tortoise in the California Desert (BLM, 1988), Instruction Memorandum CDD93-13, Instruction Memorandum CDD95-14, and Compensation for the Desert Tortoise, Desert Tortoise Management Oversight Group, 1999. The project proponent shall choose one of the following: 1) Acquire compensation lands. The location of these lands is to be determined jointly by BLM and CDFG. They will be located in the Chuckwalla Bench Area of Critical Environmental Concern (ACEC). The deed for these lands is to be delivered to the BLM. Or the project proponent shall 2) provide adequate funds (the amount to be determined by the BLM) to the BLM for the acquisition of compensation lands. These lands will be located in the Chuckwalla Bench ACEC. The last choice is for the project proponent to 3) make permanent improvements to desert tortoise habitat. This must be upon agreement with the Fish and Wildlife Service (the Service), CDFG and BLM. For the Proposed Action, the compensation ratio in Category III habitat is 1:1(130 acres in Category III habitat; 130 acres to be compensated); in Category II habitat the ratio is 4.5:1 (291 acres in Category II habitat; 1,310 to be compensated) for a total of 1,440 acres to be compensated. For the Reduced Footprint Alternative the compensation ratio in Category III habitat is 1:1 (109 acres in Category III habitat; 109 acres to be compensated); in Category II habitat, the ratio is 4.5:1 (246 acres in Category II habitat; 1,107 to be compensated) for a total of 1,216 acres to be compensated. The mine operator must work closely with the BLM in selecting the lands most benefiting the conservation and recovery efforts. Compensation requirements shall be agreed upon prior to permitting. NECI Biological Report, Appendix F shows the equation used to determine compensation ratios.

2. The Mine operator shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with protective measures for the desert tortoise, involved in compliance coordination with the BLM, and authorized to halt any mine-related actions that may be in violation of the biological opinion. The FCR (a contract biologist, company environmental coordinator, project manager, or other appropriate mine employee) shall retain a copy of the tortoise stipulations and be available on-site for all project activities.

3. Only the authorized biologist and other persons confirmed by the Fish and Wildlife Service, under the auspices of the current biological opinion, shall be permitted to handle/relocate desert

tortoises. The Service and BLM must approve the wildlife biologist who must demonstrate experience in the proper handling of desert tortoises and locating tortoises and their sign. The BLM shall submit the names and credentials of individuals to the Service for review and approval at least 15 days prior to the onset of any mine-related operations. No excavation/surface disturbing activities will commence until the authorized biologist has been selected. A biological monitor or the authorized biologist shall be present during all surveying efforts (excluding archaeological work), any power line construction, overbuilding activities, pipeline installation, water well excavation, or road realignments. The qualified biologist must have education/training/experience in conducting surveys, monitoring/supervising project operations, and implementing tortoise avoidance and minimization measures.

4. The biological monitor/authorized biologist shall regularly inspect (a minimum of three times per day) any test holes or associated open trenches, if any. Entrapped tortoises/wildlife will be permitted to move from harm's way or carefully removed from the excavation site by the authorized biologist. A final inspection of trenches and holes shall be conducted by the biological monitor/authorized biologist just prior to backfilling. All test holes shall be immediately capped/sealed upon completion of drilling.

5. Desert tortoises may only be handled by the authorized biologist or FCR in the case of an emergency, and only when necessary. Any desert tortoise relocated or otherwise removed from areas with mine-related construction/excavation shall be handled in accordance with the procedures described in *Guidelines for Handling Desert Tortoises During Construction Projects* (DTC 1994, revised 1999). All tortoises shall be trans-located to an identified tortoise relocation site.

6. BLM, in consultation with the appropriate regulatory agencies and the proponent, will identify several relocation areas for the relocation of tortoises within the vicinity of the Mesquite Mine. These areas will be at least 0.5-1.0 mile apart in suitable Microphyll Woodland habitat and a reasonable distance from paved roads and extensively used dirt roads. In order to reduce potential competition, no more than two tortoises should be relocated in each area.

7. The authorized biologist shall maintain a complete record of every desert tortoise encountered and moved from harm's way during all mine-related efforts. At a minimum, the information shall include: location (written description and map) of the tortoise finding, date and time of observation, and details of the relocation site; tortoise life history information (i.e., weight, length, width, height, and sex); general condition and health, including any apparent injuries/state of healing and occurrence of bladder voiding upon handling; and diagnostic markings (e.g., identification number or previously marked lateral scute).

8. Desert tortoises removed/relocated from the mine site or ancillary areas shall be marked for future identification. An identification number (using the acrylic paint/epoxy technique) will be affixed to the fourth costal scute (Service 1990b), and a 35 mm photograph (slide) of the carapace, plastron, and fourth left costal scute shall be obtained. No notching or replacement

of fluids by injection (i.e., syringe) shall be authorized. Any water basins, bowls, or other containers provided to a tortoise for re-hydration shall be promptly removed from the field following determination by the authorized biologist that adequate fluid replacement has occurred.

9. Upon locating a dead or injured desert tortoise, BLM will be notified within 24 hours. The BLM must then notify the appropriate field office of the Service by telephone within three days of the finding. Written notification to BLM and USFWS must be within fifteen days of the finding. The information provided must include the date and time of the finding or the incident (if known); location of the carcass; a photograph; cause of death, if known; and other pertinent information. Desert tortoise remains shall be collected, frozen as soon as possible, and delivered to the BLM. Injured animals shall be transported to a qualified veterinarian for treatment at the expense of the project proponent. If an injured animal recovers, the Service should be contacted for final disposition of the animal.

10. The authorized biologist shall submit a summary report to the Service and BLM upon completion of the clearance surveys, relocation/handling efforts, and any injuries/deaths encountered during mine-related activities. Additionally, the report will include an evaluation of the effectiveness of the avoidance/minimization measures and possible recommendations to further reduce the direct/indirect effects of the mining operations on desert tortoise and its associated habitat.

11. A raven monitoring program shall be conducted over the project's lifetime to determine whether mining actions promote an increase in the relative abundance of ravens, and, correspondingly, a higher predation rate on desert tortoise. Five monitoring stations will be established within and around the proposed site (i.e., the center and each corner) and visited on a monthly basis. During a standard observation period (15 min), the biological monitor, authorized biologist, FCR, or other Service and BLM approved individual shall record raven numbers and behavior and inspect any nest sites for desert tortoise remains, along with documenting all carcasses found (i.e., number, size, relative time of death, and distance from nest). A report will be submitted to the Service and BLM before July 1st of each year, summarizing the monitoring results. A comprehensive raven management program shall be developed and instituted in the event that significant increases in raven numbers are observed over time.

12. A desert tortoise education program shall be presented to all mine employees conducting activities at the project site, process area, or ancillary facilities. Personnel participation in the program shall precede any initiation of project actions. Following the onset of mining, new employees must formally complete the training prior to working on-site. The BLM-approved tortoise program will contain, at a minimum, the following topics: (1) desert tortoise distribution/occurrence; (2) general behavior and ecology; (3) species' sensitivity to human activities; (4) legal protection; (5) penalties for violation of State or Federal laws; (6) reporting requirements.

13. A specially designed tortoise proof fence shall be constructed around proposed disturbance areas. The fence will consist of a non-breachable barrier and support structures. Galvanized hardware cloth of 0.635 cm (0.25 in) diameter shall be attached along the base of the fence and buried a minimum of 30 cm (12 in) underground with an aboveground extension of at least 46 cm (18 in). If burial is not feasible, the bottom one-half of the fence shall be positioned flat on the ground, opposite the project/ process area, and appropriately weighted (e.g., large rocks) or secured. Overall, the smaller 0.635 cm (0.25 in) mesh size was selected to prevent tortoise entry into the mine site and minimize the likelihood of incidental reptile mortality. Fence-ensnared lizards could attract ravens and potentially/artificially increase predation upon the resident tortoises.

14. After fence installation, the authorized biologist shall conduct a thorough survey for desert tortoises within the site. All desert tortoises found shall be removed. If the removal is during the season of above ground activity, the desert tortoises shall be placed beside a burrow of appropriate size. If the removal is not in the season of above ground activity, the tortoise shall be moved (dug out of burrow if necessary) on a seasonably warm day and placed at the mouth of a burrow of appropriate size. If the desert tortoise does not enter the burrow, an artificial burrow may be needed. The authorized biologist shall be allowed some judgement and discretion to ensure that survival of the desert tortoise is likely. All tortoises shall be relocated to identified areas.

15. No later than 90 days after completion of any necessary fence construction, the FCR and the authorized biologist shall prepare a report for the BLM. The report shall document the effectiveness and practicality of the mitigation measures. Additionally, it shall include the number of desert tortoises excavated from burrows, the number of desert tortoises moved from the site, the relocation site(s), the number of desert tortoises killed or injured, and the specific information for each desert tortoise listed above. The report shall make recommendations for modifying the stipulations to enhance desert tortoise protection or to make it more workable for the operator.

16. The fence shall be regularly monitored and corrective action promptly taken to maintain the overall integrity of the tortoise barrier. Following storms, the fence's structure shall be assessed and immediately repaired at all damaged locations.

17. In washes and other areas susceptible to flash flooding, "break-away" tortoise fabric may be installed. These segments shall be loosely tied to the fence on higher ground, permitting the fabric to "break-away" in the event of substantial surface flows.

18. Small mesh nets, a solid high density polyethylene/polypropylene cover, or other appropriate screening shall be placed over the leach pad's adjoining ponds (i.e., pregnant and barren solution ponds) to prevent tortoise access and possible injury/mortality. The coverings will be regularly inspected and maintained by the applicant for the duration of the project.

19. During the development of all ancillary facilities/features (i.e., power lines, pipeline, water wells, or road realignments) all vehicles and equipment shall be limited to established roads, designated/marked spur roads, trails, and approved rights-of-way. To the maximum extent practicable, material stockpiling, equipment storage, and vehicle parking shall occur in areas of prior disturbance or generate not greater than 0.4 ha (1 acre) of new surface impacts. Additionally, to minimize surface disturbance to the surrounding habitat, the boundaries of the work areas shall be conspicuously staked, flagged, or marked. For all project-related actions, the crushing/removal of perennial vegetation shall be avoided to the maximum extent practicable.

20. Any project-related vehicle or equipment operating on the mine's ancillary/non-haul roads shall not exceed a speed limit of 25 mph. The project proponent will be responsible for enforcing this speed requirement on its employees, contractors, and agents. Additionally, cross-country or off-road travel will not be permitted at any time, except under life threatening/emergency situations.

21. Employees shall inspect beneath parked vehicles and equipment prior to traveling. If a desert tortoise is encountered, no action shall be taken until either the animal has safely and voluntarily moved away from the parked vehicle or the authorized biologist has relocated the tortoise out of harm's way.

22. If it is necessary for a worker to park temporarily outside of a cleared enclosure, the worker shall inspect for desert tortoises under the vehicle prior to moving it. If a desert tortoise is present, the worker shall carefully move the vehicle only when necessary or shall wait for the desert tortoise to move out from under the vehicle.

23. Desert tortoise notification and speed limit signs shall be posted and maintained within the project's boundaries. Employee parking areas will have conspicuous signs alerting personnel to the presence of tortoises. Speed limits shall be posted within the mine site and along all regularly traveled ancillary/non-haul roads.

24. BLM, in consultation with the Service, shall pre-approve the type(s) of chemical dust suppressant(s) used on haul/maintenance/access roads prior to their application.

25. All trash and food items shall be promptly stored in raven and coyote proof containers and regularly conveyed from the mine site. Project structures/design will minimize the potential for raven nest or perch sites and no mining features (e.g., other buildings, power/water line enhancements, etc.) beyond the scope of the currently proposed action shall be approved or authorized.

26. Structures that may function as raven nesting or perching sites are not authorized except as specifically stated in the plan of operation notice. The project proponent shall describe anticipated structures to the BLM during initial project review.

27. No pets shall be permitted at the project site, process area or ancillary facilities, at any time. Furthermore, firearms will be strictly prohibited, except for security personnel.

28. Road kill found along the mine's primary access way shall be promptly removed/buried to reduce the attraction of ravens and other potential tortoise predators to the area. Additionally, no feeding of coyotes, kit foxes, or ravens shall be allowed.

29. Upon completion of the Mesquite Mine Project, all mine-related materials and vehicles/equipment shall be promptly removed from the site. Machinery and personnel involved with the mine's subsequent reclamation shall only be permitted in the project area during the course of revegetation efforts. Once reclamation measures have been implemented, no associated equipment and supplies will be allowed to remain on-site.

Other Wildlife Species Mitigation

Bat Species

Reclamation of microphyll woodland done concurrently with mine development may reduce impacts, if any, to California leaf-nosed bat, Greater Western Mastiff bat, small-footed Myotis, Desert pallid bat, spotted bat, and Townsend's Big-eared bat.

Western Chuckwalla

1. Avoid chuckwalla habitat whenever possible.
2. Ensure that chuckwalla habitat that is avoided will have a corridor of an undisturbed lands connecting to habitat offsite. These avoidance and connection areas will be identified on a map prior to permitting.

Mule Deer

1. A mule deer fence, whose design is approved by the game branch of CDFG, should be installed along the entire perimeter of the mine property. Fences will be routinely checked for breaks.

2. Attractive water will be fenced, contained, or otherwise made unavailable to mule deer. These deterrents will be routinely checked to assure mule deer cannot access these water sources. Death of a mule deer on the mine will be reported to CDFG within one week of occurrence.

Plant Species Mitigation

Fairy Duster

1. Microcatchments will be installed in the reclaimed areas to provide areas of moisture enhancement and to aid in seed germination.

2. Where applicable, disturbed areas will be scarified to provide more conducive surfaces and substrate conditions for natural plant propagation.

3. Seeds will only be collected from plants on and in proximity to the Mesquite Mine property to enhance the potential for successful re-vegetation. These seeds shall be used in future reseeding of reclaimed areas as well as in any nursery programs conducted on-site for later transplant.

4. Mature fairy duster plants within the proposed expansion areas will be salvaged and transplanted into reclaimed areas.

5. Cuttings from local fairy duster plants will be utilized to augment population numbers.

6. Any fairy duster plants that are lost as a result of the Mine expansion will be mitigated on a 1:1 basis, either though planting of new plants in appropriate areas as described above, or through preservation of fairy duster plants located within the planned compensation lands.

Slender-lobed 4 O'clock flower

1. To the extent possible, microcatchments could be installed in any areas that benefit from moisture enhancement and continued input of wind-dispersed seed.

2. Where applicable, disturbed areas could be scarified to provide a more conducive surfaces and substrate conditions for natural plant establishment.

Winged Cryptantha

1. To the extent possible, microcatchments could be installed in any areas that benefit from moisture enhancement and continued input of wind-dispersed seed.

2. Where applicable, disturbed areas could be scarified to provide more conducive surface and substrate conditions for natural plant establishment.

Ribbed Cryptantha

1. To the extent possible, microcatchments could be installed in any areas that benefit from moisture enhancement and continued input of wind-dispersed seed.

2. Where applicable, disturbed areas could be scarified to provide more conducive surface a substrate conditions for natural plant establishment

4.1.3.5 Level of Significance After Mitigation

The mitigation measures identified would mitigate the potential mine expansion site-related impacts, such that impacts would not be significant.

4.1.4 Cultural Resources

This section is based on a cultural resource technical report prepared by Mooney & Associates [February 2000] for the proposed expansion.

4.1.4.1 Assumptions and Assessment Guidelines

Implementation of the proposed Mesquite Mine Expansion project would require local and state approvals to demonstrate compliance with CEQA. It would also require federal approval to achieve compliance with NEPA, the National Historic Preservation Act of 1966 (NHPA) and other applicable legislation and regulations. Section 106 of NHPA requires that federal agencies take into account the effects of their undertakings on properties listed or eligible for listing in the National Register of Historic Places (NRHP) and that the Advisory Council on Historic Preservation (ACHP) be afforded a reasonable opportunity to comment on the undertaking. Undertakings include those that are federally-assisted and federally-permitted, as well as those implemented by the federal agency. The regulations at 36 CFR Part 800, "Protection of Historic Properties," define the process used by federal agencies to meet these responsibilities.

The BLM has developed a Programmatic Agreement (PA) and State Protocols to meet its responsibilities under Section 106, 110(f) and 111(a), rather than by following the procedure set forth in 36 CFR Part 800.

Regulatory Context

The purpose of the Section 106 compliance process is to accommodate the needs of federal undertakings with the concerns of historic preservation and to resolve potential conflicts between the two in the public interest. This is accomplished through a consultation process among the federal agency, the ACHP, the State Historic Preservation Officer (SHPO), and other interested parties during the early planning stages of the undertaking. Since BLM manages its cultural resource program in accordance with a Programmatic Agreement and State Protocol, consultation with SHPO is required only under specific conditions. Consultation with SHPO was not required for this undertaking.

The basic steps in the Section 106 process are:

- Step 1 – Identification and Evaluation of Historic Properties (Cultural Resources)
- Step 2 – Assessment of Effects
- Step 3 – BLM/SHPO/ACHP Consultation
- Step 4 – ACHP Comment

Current Status of the Proposed Action

The Section 106 process has been completed for the Proposed Action. BLM has determined that no historic properties would be adversely affected by the Proposed Action.

4.1.4.2 Significance Criteria

Significance criteria for the Proposed Action were determined based on 36 CFR 800.5, National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) Guidelines, Appendix G, Environmental Checklist Form (approved January 1, 1999) and on performance standards or thresholds adopted by responsible agencies. An impact may be considered significant if the Project results in one or more of the following:

- Disturbance or destruction of an important archaeological resource.
- Site testing or data recovery in a manner inconsistent with standards of the Registry of Professional Archaeologists.
- Recreational collection of artifacts that destroys their scientific value and degrades the heritage value of a resource.
- Substantial adverse change in the significance of a historical resource that is listed or eligible for listing on the NRHP, State Register of Historic Resources or on a local register of historic resources.
- Substantial adverse change in the significance of a unique archaeological resource.
- Disturbance of any human remains, including those interred outside of formal cemeteries.

4.1.4.3 Impacts of the Proposed Action

Based on a Class III survey and limited testing conducted during March, April, July, and August 1999, a total of 27 sites were identified and evaluated. The Quechan Cultural Committee was consulted extensively throughout the resource identification and evaluation phases, as part of the Section 106 consultation process. Based on the evaluation and Native American consultation, the finding was made that no historic properties will be affected by the Proposed Action.

4.1.4.4 Mitigation Measures

Implementation of the proposed Mesquite Mine expansion would not result in significant impacts to cultural resources. As a result, no mitigation measures are necessary.

4.1.4.5 Level of Significance After Mitigation

No mitigation is necessary. Significant impacts would not occur.

4.1.5 Paleontological Resources

4.1.5.1 Impacts of the Proposed Action

No paleontological resources exist at the site. Therefore, no impacts to paleontology would occur as a result of the Proposed Action.

4.1.5.2 Mitigation Measures

Development of the Proposed Action would not result in paleontological resource impacts. Therefore, no mitigation would be required.

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4.1.6 Transportation

4.1.6.1 Assumptions and Assessment Guidelines

A thorough review of potential traffic conditions, which could be caused by the Proposed Action, was performed. The Proposed Action would be considered to have a significant transportation impact if project-related activity causes one of more of the following to occur:

- The volume of traffic on a given roadway to increase substantially in relationship to its design capacity (i.e., causing the existing peak-hour level of service (LOS) to drop substantially); or
- Substantial increase in road hazards; or
- Inadequate emergency access.

4.1.6.2 Impacts of the Proposed Action

Caltrans has indicated that the maximum design capacity of SR 78 exceeds 60,000 trips per day, where a trip is the passage of one vehicle in either direction across a particular location. The average daily traffic as of 1998 on SR 78 was 1,600 trips (Caltrans, 1998). Therefore, during those years, the stretch of SR 78 which passes the mine expansion site operated at LOS A or about 2.7 percent of its design capacity. However, winter weekend traffic, beginning the Friday afternoon before and ending the Monday morning after weekends from October 1st to May 31st, on this portion of SR 78 can reach LOS F flow rates.

The planned mine expansion may require an additional 20 to 30 permanent employees. This potential increase would be insignificant and would not adversely affect long-term traffic levels and patterns on SR 78 and the feeder roads. Construction equipment for the proposed expansion is already present onsite, though a very small number of temporary construction personnel may be required for specialized tasks (e.g., electrical contractors). These temporary personnel would only be needed for a short-time period (e.g., days to weeks) and would not impact traffic conditions. Since no substantial change in traffic levels increase in road hazards, or inadequate access would occur as a result of the proposed project, impacts would not be significant.

During the winter weekend period, project-related traffic would continue to contribute to an already overcrowded highway; however, since no substantial change in traffic levels will occur, no cumulatively significant impacts to SR 78 will result at this time. Nevertheless, an effort will be made to avoid scheduling project-related deliveries during these high-volume periods.

4.1.6.3 Mitigation Measures

As no significant impacts were identified in this analysis, no mitigation measures are necessary.

4.1.6.4 Level of Significance After Mitigation

No significant impact to transportation would occur.

4.1.7 Noise

4.1.7.1 Assumptions and Assessment Guidelines

Noise emissions from the project site are regulated by the Imperial County Zoning Ordinance and the Noise Element of the Imperial County General Plan. The thresholds for significance for the noise analysis in this EIR/EIS are based on the Imperial County General Plan Noise Element.

The Noise Element requires the County of Imperial to perform a formal acoustical analysis study of proposed discretionary project that may generate excessive noise if the project:

- Would be located in a Noise Impact Zone as defined in the Noise Element.
- Has the potential to generate noise in excess of the Property Line Noise Limit thresholds stated in the Noise Element.
- Would have the potential to result in a significant increase in noise levels to sensitive receptors in the area.

The Mesquite Mine is not located in a Noise Impact Zone and, because project activities would generally occur one-half mile or more from the project property line, the activities would not be a threat to exceed Property Line Noise Limit thresholds. Therefore, the following analysis evaluates the potential for this project to result in significant increases in noise levels to sensitive receptors in the area.

Noise modeling for the mine was not performed because of the remote site location and the lack of any receptors near the project boundary. The area is virtually deserted, except for the Mesquite Mine. Additionally, most of the proposed activities would be mostly buffered by the fact that they would occur within the mine pits, which would have walls that would act to alleviate project-related noise. Otherwise, noise conditions will remain unchanged from current conditions. Any occasional receptors near the project fenceline (e.g., campers) would be unlikely to experience substantial noise events.

4.1.7.2 Impacts of the Proposed Action

Proposed Mine Expansion Site

The proposed mine expansion would produce the same noise events onsite as are occurring now, including the following:

- Removal and handling of ore and overburden.
  - Drilling
  - Blasting
  - Ore and overburden loading, hauling, and dumping

- Construction of haul roads and structure
  - Earthmoving activities
  - Construction activities

Potential onsite impacts to mine employees and visitors could occur from these noise events. Federal and State laws governing worker safety, which require a safe workplace be maintained, would require the use of safety equipment and procedures to prevent noise impacts to employees and visitors. Safety equipment and procedures are discussed in Chapter 4.0, Section 4.1.12, Environmental Health and Public Safety. Because of these safety requirements, noise impacts to onsite employees and visitors would not be significant.

Potential offsite mine activity noise impacts would not be significant because of the distance between the mine expansion activities and offsite receptors. Noise that would occur would be similar to that of the existing mine and similar to that normally experienced with earthmoving activities.

Noise from the Proposed Action is not likely to affect the occasional gravel withdrawal operations in the project area, because of the distance from the project site and the local-generated noise from their own equipment. The proximity and orientation of the Chocolate Mountain Aerial Gunnery Range (CMAGR) from the proposed mine expansion site makes noise impacts to this area unlikely. The border of the aerial gunnery range is adjacent to the northern mine boundary. As a result, military personnel conducting occasional ground activities in or near the aerial gunnery range may be exposed to some noise from the mine, but not at levels that would be substantially different from existing mining activities.

Traffic along SR 78 would generally be located one or more miles from mine activities and would not experience large noise impacts. Any possible noise impacts to SR 78 traffic would occur in connection with the drainage system construction along the eastern site boundary and during placement of material on the OISAs or the leach pads closest to SR 78. This noise would be temporary, would only be associated with normal earth moving equipment, and would most likely be inaudible because of driving related noise.

Some visitors could also hear the mine activities when walking an interpretive trail that has been established along the mine access road to allow tourists to observe mining activities and historic displays for the area. This noise would be similar to that associated with the existing mining activities and, therefore, would not substantially change from existing conditions.

4.1.7.3 Mitigation Measures

Incorporated by Regulations

The Applicant shall comply with the following noise mitigation measures that are required by law:

- Imperial County General Plan, which establishes noise emissions controls for the entire County.

- Applicable Occupational Safety and Health Administration (OSHA) regulations set forth in 29 CFR 1920 and 40 CFR 241 and California Occupational Safety and Health Administration (Cal OSHA) regulations set forth in 14 CCR 3 shall be implemented by the Applicant.

Incorporated to Avoid Significant Impacts

Noise impacts to sensitive receptors from the Proposed Action would not be significant with implementation of the above mitigation measures. As a result, the noise emissions from the Proposed Action would be consistent with Imperial County noise control measures. No additional noise mitigation measures beyond those identified as incorporated by regulation or as part of the project design in Section 4.1.7.3 would be required.

4.1.7.4 Level of Significance After Mitigation

Based upon regulatory requirements and noise attenuating measures that would be incorporated into the project design, no significant impact due to noise would occur from the Proposed Action.

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4.1.8 Air Quality

This section assesses the potential air quality impacts of the Proposed Action, and finds that they are less than significant. The analysis is representative of both the Proposed Action and the Reduced Footprint Alternative because the emission sources and rates are the same. The sources were placed conservatively to produce maximum impact for either alternative, which differ mostly in their specific spatial configuration. Additional details of the analysis are provided in Air Quality Appendix A (not in this document). This section is organized to introduce the objectives of the assessment, followed by assessment guidelines and assumptions about the Proposed Action. Air emission sources are then described along with their potential impacts. Measures to mitigate impacts are discussed, and finally, the level of significance after mitigation is described.

4.1.8.1 Introduction

The detailed analysis of the Proposed Action includes specification of the scenario that would cause the maximum potential impact. Maximum production rate, expressed as the amount of mined overburden/interburden and ore, and the location of mining activities are key variables in specifying the maximum impact scenario.

The analysis begins with the identification of project sources of air pollutants. Emission factors are based on the scientific literature.(1) Emissions are estimated from factors and characteristics of each emission source to create input information needed for the Industrial Source Complex (ISC3) dispersion model. The ISC3 model requires source locations, emission rates, annual meteorological data, and receptor locations, in order to predict ground-level ambient air quality concentrations from simulated atmospheric dispersion.

Meteorological data for one year (April 1, 1991 through March 31, 1992) from the Mesquite Mine monitoring tower (see Figure 3.8-2) is used in the dispersion model. The model computes ambient concentrations of criteria and noncriteria pollutants at specific receptor points. Noncriteria pollutants are used to compute potential carcinogenic, and chronic and acute noncarcinogenic health risks.

Mitigation measures capable of reducing project-related impacts to below a level of significance are identified. The air quality analysis concludes that these measures, if implemented, would mitigate potential impacts to insignificant levels.

4.1.8.2 Assumptions and Assessment Guidelines

Assumptions and assessment guidelines are explicitly described to make clear the maximum scenario that is being assessed, and thresholds below which potential impacts to air quality would be insignificant. For convenience, assumptions are classified as the following sections: general, emission sources (mobile, stationary, and fugitive), and measures of significant impacts.

(1) Including documents and computer programs made available on the Internet by EPA and CARB.

General

Air quality impacts are analyzed for the Proposed Action, which is scheduled to operate through the year 2006. Although air pollution control technology continues to advance, the analysis is conservative by assuming current control technology.

Basic production parameters and related additional assumptions are listed in Table 4.1.8-1. An important change in the operation of the mine for the Proposed Action is that an electric-powered shovel and drills would replace the current diesel-powered shovels and drills and shovel for the most part. A maximum of 35 percent of shoveling would be done by diesel-powered equipment and would occur at depths in the East Rainbow Pit below 300 feet. This use of electric drills would substantially decrease the amount of diesel-fuel, associated air emissions, and potential offsite impacts. Comparison with Table 3.8-14 shows that one difference in quantitative assumptions is the maximum speed limits. The limit is 35 miles per hour for existing conditions. For the Proposed Action, the speed limit is 38 mph, slightly higher. In these tables, the expansion and current maximum daily production rates are set 50 percent higher than the average daily production rates, respectively. This increase provides an adequate margin to assure the analysis accounts for days of maximum activity.

Expansion of mining activity for the Proposed Action occurs in new areas identified in Figure 4.1.8-1. Table 4.1.8-1 contains assumptions related to the location and distribution of emissions needed for modeling their dispersion.

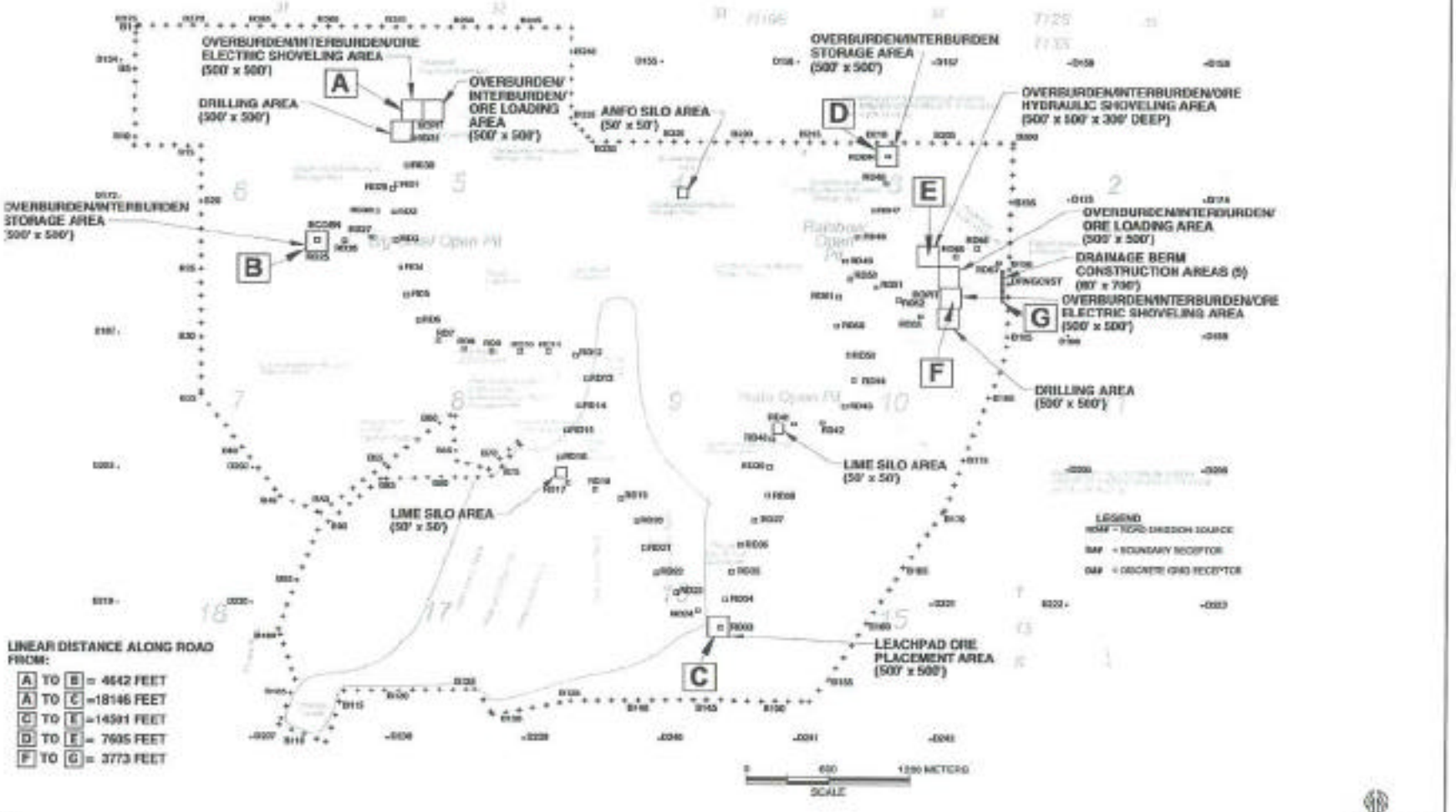
Emission Sources

Mesquite Mine is a stationary source, regulated as described in Section 3.8.2. Within the mine there are three types of emission sources mobile, point and fugitive. Mobile sources are discussed first because this category emits the most. The mobile emissions include five primary pollutants(2). Point sources at the mine emit the same five primary pollutants. Fugitive sources emit particulates with aerodynamic diameters less than or equal to 10 micrometers (PM_{10}).

The scenario of operations for the Proposed Action that would cause the maximum potential air quality impacts is based on the same level of activities as currently permitted. Both are limited to a total annual production of 60 million tons of overburden/interburden and ore. During the 6-year period of the Proposed Action, the time in the year with maximum emissions will occur when the drainage diversion facilities will be constructed at the same time as mining operations. This emission source lasts for a period of up to 60 days.

The mine has a fleet of off-road equipment to carry out mining activities. The fuel used to mine 24 million tons per year is known, and is increased by a factor of 2.5 (= 60/24) to obtain the fuel needed to mine 60 million tons per year.

(2) The total set of criteria pollutants, each of which has ambient air quality standards (AAQS), is listed in Table 3.8-3. Nitrogen oxides (NO_x), PM_{10}, sulfur oxides (SO_x), and carbon monoxide (CO) are the only criteria pollutants having large enough emission rates to contribute to an emission inventory. Reactive organic compounds (ROC) is a substantial emission that does not have its own AAQS, but, is a precursor to ozone (O_3).



SOURCE: TRC, 1999.

Mesquite Mine Expansion EIR/EIS

Source and Receptor Locations

FIGURE 4.1.8-1

Table 4.1.8-1

Assumptions to Calculate The Maximum Emission Inventory Mesquite Mine Expansion

- Expansion annual rate = currently permitted production rate = 60 million total tons overburden/interburden and ore per year.
- Expansion annual work schedule = 356 days per year, assuming 9 holidays.
- Expansion average daily production rate (to accomplish maximum permitted annual production rate) = 168,539 total tons overburden/interburden and ore per day.
- Ratio of expansion maximum to average daily production rates = 1.5.
- Expansion maximum daily production rate = 252,809 total tons overburden/interburden and ore per day.
- Concurrent activities during maximum expansion scenario:
  - Mining at Rainbow and Big Chief Pits (chosen because two pits will be used concurrently, and these two are closer to the boundary than Vista):
    - Blasting and drilling (electric) of new overburden/interburden and ore
    - Shoveling (electric and diesel) of overburden/interburden and ore into haul trucks
    - Loading of overburden/interburden and ore into haul trucks
    - Hauling of overburden/interburden and ore
    - Placement of overburden/interburden on storage area or drainage diversion berm
    - Placement of ore on leach pad
  - Drainage diversion facility construction
- To account for maximum potential daily emissions and air quality impact, the emissions associated with mining 252,809 tons per day will be placed in appropriate areas for mining activities and drainage construction, because the latter is closest to a boundary (50 feet).
- To conservatively account for maximum potential annual emissions and associated impacts, the inventory will account for the following:
  - mining 60 million tons
  - maximum daily emissions for mining and drainage construction during 60 days at the drainage diversion for the East Rainbow Extension
- The maximum impact of mining activities at the East Rainbow and Big Chief Extensions would occur during the initial days of mining the currently undisturbed and unpermitted overburden from one bench below grade in the existing pits. Three 500-foot squares represent the areas of drilling (electric)/blasting, shoveling (electric) overburden/interburden and ore, and loading overburden/interburden and ore (one each) in each of these two pits. An extra 500-foot square located 300 feet below grade represents the area of hydraulic shoveling (diesel) overburden/interburden and ore in East Rainbow Pit.
- The lowest portion of the East Rainbow North Overburden/Interburden Storage Area is at grade.
- Vehicle exhaust emission factors from the first expansion project year (i.e. 2001) are used from the literature because they are higher than for later years and because evolving engine improvements will reduce emissions slightly each successive year.
- Onsite vehicle speed limit = 38 miles per hour.

Table 4.1.8-1

Assumptions to Calculate The Maximum Emission Inventory Mesquite Mine Expansion

Continued

- Fugitive dust calculations for unpaved roads assume a PM_{10} control efficiency of 80 percent, and a width of 100 feet. The 80 percent requires that the current watering frequency and application rate of 0.18 gallons per square yard be augmented by occasional application of a chemical suppressant. A ground inventory of at least 0.13 gallons of petroleum resin (or equivalent chemical suppressant) per square yard must be built up by at least 5 biweekly applications of 1 part resin to 5 parts water.
- The boiler and carbon kiln are heated with liquid petroleum gas (LPG) having a heat of combustion of 94,000 British Thermal Units (BTU) per gallon and a density of 4.20 pounds per gallon.
- The PM_{10} emission factor for the induction (electric) furnace is 0.019 pounds per hour, based on source tests on similar furnaces at the Twin Creeks Mine in Nevada. Other emission factors are in Appendix A.
- The distributions of each equipment type at the areas of mining activity are listed in Appendix A Air Quality Appendix A.
  - The diesel-fueled hydraulic shovel is limited to a maximum of 35 percent of the digging of overburden/interburden and ore.
  - The hydraulic shovel would operate at depths in the East Rainbow Pit no closer to the surface than 300 feet.
- The drainage diversion structure would be constructed during the 2 winter months of December and January. If construction were to occur during other periods in the year, then the Northeast Boundary PM_{10} sampler would be used to confirm compliance with the California 24-hour PM_{10} ambient air quality standard. {TRC}

99-116 (2/28/00/ks)

Mining activities occur at various locations around the mine. These locations will change during the expansion period. The specific activity locations chosen for the analysis are selected as a realistic combination that could create maximum potential air quality impacts. Figure 4.8.1-1 has two sets of 500-foot squares to indicate areas for drilling, electric shoveling overburden/interburden and ore, and loading overburden/interburden and ore in Rainbow and Big Chief Pits. In addition, the Rainbow Pit also has a 500-foot square to indicate the area for hydraulic (diesel-fueled) shoveling of overburden/interburden and ore. These pits are chosen because they are closer to the property boundary than Vista Pit. The nearest receptors are those spaced along the property boundary at 100-meter intervals. A rectangle with nine segments, a width of 80 feet, and length of 700 feet is placed on the East Rainbow drainage diversion structure to represent placement of overburden/interburden closest to the property boundary during a short period of time (i.e., 60 days). This rectangle is no closer than 50 feet from the boundary.

A square, 500 feet on a side, is located at the East Rainbow North Overburden/Interburden Storage Area to show where overburden/interburden is placed when it is not used for constructing the drainage diversion structure.

Overburden/interburden from the Big Chief North Expansion is assumed to be placed in a 500-foot square on the west side of the mine. A 500-foot square is located at the south side for the placement of ore from both Rainbow and Big Chief Pits on Leach Pad No. 6 (see bottom of Figure 4.1.8-1). Smaller (i.e., 50-foot) squares in the central and east portions of the mine represent lime silos, while another 50-foot square on the north side of the mine represents the ANFO silo.

Mobile Sources

The types of off-road mining and construction equipment expected to be used for the Proposed Action are listed in Tables 4.1.8-2A and 4.1.8-2B. Fuel use data (in Air Quality Appendix A) for the eight most fuel-consuming types during the period January through July 1999, a year when production was approximately 24 million tons, were scaled up to estimate the fuel needed to mine 60 million tons of overburden/interburden and ore. No fuel use is shown for the drills because they will be electric-powered. Electric shovels will be used for 65 percent of shoveling, while the existing diesel-fueled hydraulic shovels will only be used for 35 percent of shoveling.

Haul trucks currently consume approximately 62 percent of the total diesel fuel used by heavy-duty equipment at the mine. Table 4.1.8-2A shows the estimated distances these trucks would travel to haul 168,539 tons of overburden/interburden and ore in one average production day and to haul 60 million tons in 1 year. Air Quality Appendix A contains the calculation of the annual distance, based on detailed analysis of the carrying capacity of the fleet of haul trucks.

The estimated fuel consumption of each mobile equipment type was combined with emission factors for the five primary criteria pollutants and other parameters to compute the daily and annual emission rates shown in Table 4.1.8-3. The emission factors were obtained from EPA and CARB (see Air Quality Appendix A).

Table 4.1.8-2a
Equipment Type Usage Without Drainage Construction
Mesquite Mine Expansion

Equipment Type	Maximum Number Of Units Per Type	Equipment Type Average Monthly Fuel Consumption(1) (Gallons/Month)	Equipment Type Monthly Usage(1) (Hrs/Month)	Equipment Type Daily Usage(2) (Hrs/Day)	Onsite Round-Trip Distance Traveled By Equipment Type		Notes
					Maximum (mi/yr)	Maximum (mi/day)(3)	
• Loaders	2	2,100	96	3.3	--	--	4
• Haul Trucks	21	363,831	12,248	412.9	1,176,571	4,840	
• Track Dozers	5	28,348	2,337	78.8	--	--	
• Rubber-Tire Dozers	5	13,837	1,228	41.4	--	--	
• Drills	3	0	903	30.4	--	--	5
• Cranes	3	--	2.5	0.084	--	--	
• Motor Graders	4	7,789	1,123	37.8	--	--	
• Shovel (diesel & electric)	4	38,376	1,842	62.1	--	--	6
• Fork Lift	5	--	200	6.7	--	--	
• Water Truck (diesel)	3	18,754	1,420		198,000	834	7,10
• Service Truck (diesel)	13	--	--	--	125,000	351	7
• Light Plant	13	--	1,250	42.1	--	--	
• Compressor	4	--	10	0.3	--	--	
• Welder	7	--	13	0.4	--	--	
• Pump	8	--	38	1.3	--	--	
• Small-Med. Truck (gasoline)	43	--	--	--	485,213	1363	7
• Medium Truck (diesel)	10	--	--	--	125,000	351	7
• Generator (diesel)	7	--	2,700	107	--	--	8
• Generator, portable (gasoline)	2	--	50.7	2	--	--	9

99-116 (3/2/00/mc)

1) Average monthly usage is calculated by multiplying current usage by the ratio of expanded mine production rate and current rate.

Max. mine expansion production (million tons of overburden/interburden and ore per year) = 60
Current mine production (million tons of overburden/interburden and ore per year) = 24 Ratio = 2.5

2) Total daily usage equals average monthly usage divided by working days per month. Average number of working days per month =29.67
3) Days/Year = 356 (=365-9 Holidays)
4) Loader use and associated fuel consumption would be substantially decreased in the expansion mine plan.
5) Diesel-fueled drills will be replaced with electric powered drills, hence eliminating exhaust emissions.
6) The shoveling activities will use diesel-powered shovels 35% of the time, the rest will be with electric-powered shovels.
7) Water trucks travel distances proportional to total production. Annual mileages for expansion are equal to current mileages times production ratio.
8) Two diesel-fueled generators are assumed to run 24 hours a day to pump water out of Big Chief and Vista Pits. Other diesel-fueled generators are only run up to 1 hour per month for testing.
9) The two portable gas-fueled generators are assumed to operate 1 hour every mining day.
10) Maximum scenario day is based on average day to achieve permitted production times the following factor: 1.5

-- = Not applicable.

Table 4.1.8-2B
Equipment Type Usage with Drainage Construction, Mesquite Mine Expansion

EQUIPMENT TYPE	MAXIMUM NUMBER OF UNITS PER TYPE	EQUIPMENT TYPE AVERAGE MONTHLY FUEL CONSUMP-TION(1) (gal./ month)	EQUIPMENT TYPE MONTHLY USAGE(1) (hrs/month)	EQUIPMENT TYPE DAILY USAGE(2) (hrs/day)	ONSITE ROUND-TRIP DISTANCE TRAVELED BY EQUIPMENT TYPE		NOTES
					Maximum (mi/yr)	Maximum (mi/day) (3)	
· Loaders	2	2,100	96	3.3	--	--	4
· Haul Trucks	21	363,831	12,248	412.9	1,166,540	4,680	
· Track Dozers	5	28,348	2,337	78.8	--	--	
· Rubber-Tire Dozers	5	13,837	1,228	41.4	--	--	
· Drills	3	0	903	30.4	--	--	5
· Cranes	3	--	2.5	0.084	--	--	
· Motor Graders	4	7,789	1,123	37.8	--	--	
· Shovel (diesel & electric)	4	38,376	1,842	62.1	--	--	6
· Fork Lift	5	--	200	6.7	--	--	
· Water Truck (diesel)	3	18,754	1,420		198,000	834	7,10
· Service Truck (diesel)	13	--	--	--	125,000	351	7
· Light Plant	13	--	1,250	42.1	--	--	
· Compressor	4	--	10	0.3	--	--	
· Welder	7	--	13	0.4	--	--	
· Pump	8	--	38	1.3	--	--	
· Small-Med. Truck (gasoline)	43	--	--	--	485,213	1363	7
· Medium Truck (diesel)	10	--	--	--	125,000	351	7
· Generator (diesel)	7	--	2,700	107	--	--	8
· Generator, portable (gasoline)	2	--	50.7	2	--	--	9

-- = Not applicable. SOURCE: TRC, 2000

(1) Average monthly usage is calculated by multiplying current usage by the ratio of expanded mine production rate and current rate.
Max. mine expansion production (million tons of overburden/interburden and ore per year)
Current mine production (million tons of overburden/interburden and ore per year)

(2) Total daily usage equals average monthly usage divided by working days per month.
Average number of working days per month

(3) Days/Year = 356 (= 365-9 Hols)

(4) Loader use and associated fuel consumption would be substantially decreased in the expansion mine plan.

(5) Diesel-fueled drills will be replaced with electric powered drills, hence eliminating exhaust emissions.

(6) The shoveling activities will use diesel-powered shovels

(7) Water trucks travel distances proportional to total production. Annual mileages for expansion are equal to current mileages times production ratio.

(8) Two diesel-fueled generators are assumed to run 24 hours a day to pump water out of Big Chief and Vista Pits. Other diesel-fueled generators are only run up to 1 hour per month for testing.

(9) The two portable gas-fueled generators are assumed to operate 1 hour every mining day.

(10) Maximum scenario day is based on average day to achieve permitted production times the following factor:

Of the different equipment types, the haul truck category emits the most, accounting for at least two-thirds of the total onsite NOx emissions. This amount is consistent with the percentage of fuel used by haul trucks as noted above.

Small amounts of criteria pollutants would be emitted offsite by employees commuting to the mine and trucks delivering supplies. These emissions are shown in Table 4.1.8-4. The number of employees is estimated at 184, approximately 20 more than the current 164. The analysis assumes that ten trucks would deliver supplies to the Mine each day.

Stationary Point Sources

The Proposed Action contains the following point sources: six diesel fuel storage tanks, one gasoline storage tank, an electric smelting furnace, carbon kiln (burner section and drum section), a boiler, and an electrowinning cell (see Table 4.1.8-3). Only small amounts of ROC would escape from the vents on the fuel tanks.

Combustion of liquefied petroleum gas (LPG) in the boiler and carbon kiln (burner section only) emits small amounts of the five criteria pollutants (see Table 4.1.8-3). Small amounts of PM_{10} would continue to be emitted by the electric smelting furnace and electrowinning cell.

Fugitive Dust (PM_{10}) Sources

Fugitive dust, which includes PM_{10}, is generated by the travel of haul trucks and other vehicles on the unpaved roads; travel of employees and delivery vehicles on paved roads; wind erosion of soil disturbed by mining activities; dozing of overburden/interburden and ore in the loading areas, storage areas, and on the extension of Leach Pad No. 6; drilling, blasting, and lime and ANFO loading and unloading. As can be seen in Tables 4.1.8-5A and 4.1.8-5B (without and with drainage construction), the travel of haul trucks on unpaved roads is the largest generator of fugitive PM_{10}.

Fugitive PM_{10} emissions are controlled by watering the unpaved roads and activity areas. The watering frequency and application rate determine the effectiveness of this control. The southeast desert region of California has the highest potential evapotranspiration rate in the nation (Cowherd et al, 1988), and hence, requires frequent watering to control fugitive PM_{10} emissions.

The current fugitive dust control program for unpaved roads would be augmented to justify use of at least 80 percent control efficiency as shown in Tables 4.1.8-5A and 4.1.8-5B. One protocol that could be used to achieve this control level is use of a chemical dust suppressant. Following guidance in USEPA (1998), a chemical dust suppressant would be added to the haul road treatment water every two weeks at a concentration of 1 part to 5 parts water. The solution would be applied at the current rate of 0.18 gallons per square yard (gal/sq.yd.), which means that each application could add 0.03 gal/sq.yd. of petroleum resin to the ground inventory. After at least five applications, which would occur at the eighth week in the augmented program, the ground inventory would increase to 0.15 gal/sq.yd., for which the control efficiency would exceed 80 percent according to Figure 13.2.2-4 in USEPA (1998). More details on this calculation are given in Air Quality Appendix A. This dust suppressant protocol would be repeated if road maintenance completely removed the treated

Table 4.1.8-3

Onsite Stationary and Mobile Source Criteria Pollutant Emissions During Drainage Construction
Mesquite Mine Expansion

SOURCE	ENGINE HP RATING	LOAD FACTOR (1)	DAILY USAGE FOR EQUIPMENT TYPE (2,3)	ANNUAL USAGE FOR EQUIPMENT TYPE (2)	ONSITE ROUND-TRIP DISTANCE TRAVELED BY EQUIPMENT TYPE		NOx			ROC			PM_{10}			SOx			CO			NOTES
					Maximum (mi/day)[6]	Maximum (mi/yr)	EMISSION FACTOR	EMISSIONS		EMISSION FACTOR	EMISSIONS		EMISSION FACTOR	EMISSIONS		EMISSION FACTOR	EMISSIONS		EMISSION FACTOR	EMISSIONS		
							(4)	(lbs/day)	(tons/yr)	(4)	(lbs/day)	(tons/yr)	(4)	(lbs/day)	(tons/yr)	(4)	(lbs/day)	(tons/yr)	(4)	(lbs/day)	(tons/yr)	
Mobile Sources																						
Loader	--	--	71 gal/day	25,200 gal/yr	--	--	146 g/gal	23	4	20 g/gal	3	1	13 g/gal	2	0	14 g/gal	2	0	45 g/gal	7	1	
Haul Trucks	--	--	18,396 gal/day	4,365,973 gal/yr	--	--	130 g/gal	5,263	625	6 g/gal	242	29	8 g/gal	326	39	14 g/gal	574	68	56 g/gal	2,271	270	
Track Dozer	--	--	1433.3 gal/day	340,174 gal/yr	--	--	129 g/gal	408	48.5	13 g/gal	40	4.7	11 g/gal	36	4.3	14 g/gal	45	5.3	36 g/gal	113	13.4	
Rubber-Tire Dozer	--	--	699.6 gal/day	166,046 gal/yr	--	--	198 g/gal	306	36.3	29 g/gal	45	5.4	6.7 g/gal	10	1.2	14 g/gal	22	2.6	122 g/gal	188	22.3	
Drill (electric)	--	--	0.0 gal/day	0 gal/yr	--	--	167 g/gal	0	0.0	15 g/gal	0	0.0	14 g/gal	0	0.0	14 g/gal	0	0.0	70 g/gal	0	0.0	(5)
Crane	240	0.43	1.0 hours/day	30 hours/year	--	--	0.023 lb/hp-hr	2.4	0.04	0.003 lb/hp-hr	0.3	0.00	0.002 lb/hp-hr	0.2	0.00	0.002 lb/hp-hr	0.2	0.00	0.009 lb/hp-hr	0.9	0.01	(6)
Motor Grader	--	--	263 gal/day	93,467 gal/yr	--	--	115 g/gal	67	11.9	6 g/gal	3	0.6	10 g/gal	6	1.0	14 g/gal	8	1.5	25 g/gal	14	2.6	
Shovel (diesel)	--	--	1702 gal/day	403,958 gal/yr	--	--	167 g/gal	626	74	15 g/gal	57	7	14 g/gal	51	6	14 g/gal	53	6	70 g/gal	261	31	(14)
Fork Lift	80	0.30	6.7 hours/day	2,400 hours/year	--	--	1.7 lb/hr	3.44	0.61	0.15 lb/hr	0.30	0.05	0.14 lb/hr	0.28	0.05	0.143 lb/hr	0.29	0.05	0.675 lb/hr	1.37	0.24	(7)
Water Truck (diesel)	--	--	--	--	834	198,000	9.68 g/mi	17.8	2.11	1.31 g/mi	2.4	0.29	0.75 g/mi	1.4	0.16	0.31 g/mi	0.6	0.07	7.27 g/mi	13.4	1.59	(8)
Service Truck (diesel)	--	--	--	--	351	125,000	6.82 g/mi	5.3	0.94	1.02 g/mi	0.8	0.14	0.50 g/mi	0.4	0.07	0.31 g/mi	0.2	0.04	6.01 g/mi	4.7	0.83	(9)
Light Plant	40	0.74	42.1 hours/day	15,000 hours/year	--	--	0.018 lb/hp-hr	22.4	4.00	0.002 lb/hp-hr	2.5	0.44	0.001 lb/hp-hr	1.2	0.22	0.002 lb/hp-hr	2.5	0.44	0.011 lb/hp-hr	13.7	2.44	(10)
Compressor	90	0.48	0.3 hours/day	120 hours/year	--	--	1.7 lb/hr	0.28	0.05	0.15 lb/hr	0.02	0.004	0.14 lb/hr	0.02	0.004	0.143 lb/hr	0.02	0.004	0.675 lb/hr	0.11	0.02	(7)
Welder	90	0.45	0.4 hours/day	150 hours/year	--	--	1.7 lb/hr	0.32	0.06	0.15 lb/hr	0.03	0.01	0.14 lb/hr	0.03	0.005	0.143 lb/hr	0.03	0.005	0.675 lb/hr	0.13	0.02	(7)
Pump, Water	180	0.74	1.3 hours/day	454 hours/year	--	--	1.7 lb/hr	1.60	0.29	0.15 lb/hr	0.14	0.03	0.14 lb/hr	0.13	0.02	0.143 lb/hr	0.13	0.02	0.675 lb/hr	0.64	0.11	(7)
Small-Med. Truck (gasoline)	--	--	--	--	1,363	485,213	3.19 g/mi	9.6	1.71	0.30 g/mi	0.9	0.16	0.05 g/mi	0.2	0.03	0.31 g/mi	0.9	0.17	5.84 g/mi	17.5	3.12	(11)
Medium Truck (diesel)	--	--	--	--	351	125,000	6.82 g/mi	5.3	0.94	1.02 g/mi	0.8	0.14	0.50 g/mi	0.4	0.07	0.31 g/mi	0.2	0.04	6.0 g/mi	4.7	0.83	(9)
Generator (diesel)	60	0.74	106.6 hours/day	32,400 hours/year	--	--	1.7 lb/hr	181	9.7	0.15 lb/hr	16	0.9	0.14 lb/hr	15	0.8	0.143 lb/hr	15	0.8	0.675 lb/hr	72	3.8	(7)
Generator (gasoline)	10	0.74	2.0 hours/day	608 hours/year	--	--	0.41 lb/hr	0.6	0.00	0.54 lb/hr	0.8	0.00	0.026 lb/hr	0.04	0.80	0.02 lb/hr	0.03	0.00	17.0 lb/hr	25	0.02	(12)
Stationary Sources																						
Smelting Furnace (electric)	--	--	24 hours/day	8760 hours/year	--	--	--	--	--	--	--	--	0.019 lb/hr	0.5	0.08	--	--	--	--	--	--	
Carbon Kiln (LPG), Burner Section	--	--	--	1.1 kgal/year	--	--	20 lb/kgal	0.06	0.011	0.55 lb/kgal	0.0016	0.0003	0.60 lb/kgal	0.0018	0.0003	0.017 lb/kgal	0.0001	0.00001	3.40 lb/kgal	0.01	0.002	(13)
Carbon Kiln / Drum Section	--	--	--		--	--	--	--	--	--	--	--	--	2.5	0.46	--	--	--	--	--	--	(15)
Boiler (LPG)	--	--	--	44 kgal/year	--	--	20 lb/kgal	2.4	0.4	0.55 lb/kgal	0.07	0.012	0.60 lb/kgal	0.07	0.013	0.017 lb/kgal	0.0021	0.0004	3.40 lb/kgal	0.41	0.07	(13)
Electro-winning Cell	--	--	24 hours/day	8760 hours/year	--	--	--	--	--	--	--	--	0.17 lb/hr	4.1	0.74	--	--	--	--	--	--	
Gasoline Storage Tank	--	--	--	--	--	--	--	--	--	--	13.9	2.54	--	--	--	--	--	--	--	--	--	
Diesel Storage Tank #1	--	--	--	--	--	--	--	--	--	--	7.7E-04	1.4E-04	--	--	--	--	--	--	--	--	--	
Diesel Storage Tank #2	--	--	--	--	--	--	--	--	--	--	3.9E-03	7.2E-04	--	--	--	--	--	--	--	--	--	
Diesel Storage Tank #3	--	--	--	--	--	--	--	--	--	--	0.35	0.06	--	--	--	--	--	--	--	--	--	
Diesel Storage Tank #4	--	--	--	--	--	--	--	--	--	--	5.2E-04	9.5E-05	--	--	--	--	--	--	--	--	--	
Diesel Storage Tank #5	--	--	--	--	--	--	--	--	--	--	1.1E-03	2.0E-04	--	--	--	--	--	--	--	--	--	
Diesel Storage Tank #6	--	--	--	--	--	--	--	--	--	--	1.1E-03	2.0E-04	--	--	--	--	--	--	--	--	--	
TOTAL								6,945	820		430	51		458	55		724	86		3,009	353	

-- = Not applicable.

1ed.

2) Calculated from mean monthly fuel usage for all units of each equipment type.

3) Maximum scenario day is based on average day to achieve permitted production times the following factor: 1.5

4) Emission factors are from USEPA, California Air Resources Board, and South Coast Air Quality Management District, as shown in Appendix A.

5) Diesel-fueled drills will be replaced with electric powered drills, hence eliminating exhaust emissions.

6) Emission factors from SCAQMD CEQA Handbook Table A9-8-B, November 1993 (also found in Appendix A). Crane use does not increase for maximum scenario day.

7) Emission factors for miscellaneous diesel equipment from SCAQMD CEQA Handbook Table A9-8-A (also found in Appendix A). Fork lift use does not increase for maximum scenario day.

8) Emission factors for heavy-heavy diesel trucks from MVEI7G Emission Factors (1999, 35mph, 75F)

9) Emission factors for medium-heavy diesel trucks from MVEI7G Emission Factors (1999, 35mph, 75F)

10) Emission factors for generator sets less than 50 hp from SCAQMD CEQA Handbook TableA9-8-B (also found in Appendix A).

11) Emission factors for gasoline-fueled vehicle emission factors from MVEI7G (1999, 35 mph, 75F).

12) Emission factors for miscellaneous gasoline-fueled equipment from SCAQMD CEQA Handbook Table A9--8-A (also found in Appendix A).

13) Emission factors, in pounds per 1000 gallons LPG, are taken from U.S. EPA, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Chapter 1.5: Liquefied Petroleum Gas Combustion, Table 1.5-1, October 1996.

1ard diesel-fueled O&K RH170 shovels by a ratio of 57 cu.yd. per gal./50 cu.yd. per gal.

15) The Carbon Kiln Drum Section has a stack scrubber with a control efficiency (%) = 90%

TABLE 4.1.8-4
OFFSITE CRITERIA POLLUTANT EMISSION INVENTORY
MESQUITE MINE EXPANSION

SOURCE	TOTAL DAILY USAGE (1)	TOTAL ANNUAL USAGE (2)	MAXIMUM NUMBER OF UNITS (3)	OFF-SITE ROUND-TRIP DISTANCE		SOx			BOC			PM_{10}			NOx			CO			NOTES
				(mi/day-unit)	(mi/yr-unit)	EMISSION FACTOR	EMISSIONS (lbs/day)	EMISSIONS (tons/yr)	EMISSION FACTOR	EMISSIONS (lbs/day)	EMISSIONS (tons/yr)	EMISSION FACTOR	EMISSIONS (lbs/day)	EMISSIONS (tons/yr)	EMISSION FACTOR	EMISSIONS (lbs/day)	EMISSIONS (tons/yr)	EMISSION FACTOR	EMISSIONS (lbs/day)	EMISSIONS (tons/yr)	
Commuting Small-Med. Cars/Trucks (gasoline)	1	356	92	90	32,040	2.78 g/mi	51	9.0	1.37 g/mi	23.4	3.80	0.00 g/mi	0.0	0.00	0.06 g/mi	1.1	0.19	24.69 g/mi	450.7	80.2	4
Delivery Trucks (diesel)	1	356	10	90	32,040	19.31 g/mi	38	6.8	0.96 g/mi	1.9	0.33	0.75 g/mi	1.5	0.26	0.31 g/mi	0.6	0.11	7.95 g/mi	15.8	2.8	5
TOTAL							89	15.8		23.2	4.13		1.5	0.26		1.7	0.30		466.5	83.0	

– = Not applicable.

1) Assumes each vehicle makes one round trip to the mine each working day.

2) Based on 7 days per week for 52 weeks per year minus 9 holidays.

3) Conservatively assumes normal 164 workers plus 20 new hires, and carpooling at 2 persons per vehicle.

4) Emission factors for gasoline-fueled light-duty trucks from MVEI7G (1999, 65 mph, 75F). See Appendix A.

5) Fleet of fuel, maintenance supplies, express mail, etc. Emission factors for diesel-fueled heavy-heavy duty trucks (to be conservative) from MVEI7G Emission Factors (1999, 65mph, 75F). See Appendix A.

4.1.8-13

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TABLE 4.1.8-5A
ONSITE FUGITIVE PM10 EMISSIONS WITHOUT DRAINAGE CONSTRUCTION (1)
MESQUITE MINE EXPANSION

Source Category	Source Description	No. units	Round-Trip Distance per Unit (miles)	Daily Vehicle Miles Traveled (miles)	Hours Per Day	Uncontrolled Emission Factor	Uncontrolled Emission Rate (lb/day)	Control Technique	Control Efficiency (%)	Controlled Emission Rate Max. Day (lb/day)	Controlled Emission Rate Max. Day (g/sec)	Controlled Emission Rate Annual (g/sec)	Controlled Emission Rate Annual (tons/yr)	Notes
Paved Road: Property line to administration area (Distance = 200 yards).														
	Employee Vehicles	92	0.23	21 vmt/day	24	0.330 lb/vmt	6.9	None	0%	6.90	0.0362	0.0362	1.2	2
	Delivery Vehicles	10	0.23	2 vmt/day	24	0.368 lb/vmt	0.8	None	0%	0.84	0.0044	0.0044	0.15	2
SUBTOTAL - PAVED ROAD EMISSIONS							7.7			7.7	0.041	0.041	1.38	
Unpaved Roads														
	Haul Truck	--	--	4840 vmt/day	24	3.10 lb/vmt	10,147	(3)	80%	2,029	10.7	7.1	240.8	3,4
	Motor Grader	4	6.3	17 vmt/day	24	0.05 lb/vmt	0.90	(3)	80%	0.2	0.0009	0.0009	0.032	3,5
	Service Truck (diesel)	13	6.1	79 vmt/day	24	2.12 lb/vmt	167	(3)	80%	33.4	0.175	0.175	5.9	3,6
	Small-Med. Truck (gasoline)	43	6.1	261 vmt/day	24	1.41 lb/vmt	368	(3)	80%	73.6	0.386	0.386	13.1	3,4
	Medium Truck (diesel)	10	6.1	61 vmt/day	24	2.12 lb/vmt	128	(3)	80%	25.7	0.135	0.135	4.6	3,4
SUBTOTAL - UNPAVED ROAD EMISSIONS							10,810			2,162	11	7.8	264.4	

Source Category	Source Description	Amount	No. units	Activity Intensity	Hours Per Day	Uncontrolled Emission Factor	Uncontrolled Emission Rate (lb/day)	Control Technique	Control Efficiency (%)	Controlled Emission Rate Maximum Day (lb/day)	Controlled Emission Rate Maximum Day (lb/day-acre)	Controlled Emission Rate Maximum Day (g/sec-m^2)	Controlled Emission Rate Annual tons/year	Notes
Miscellaneous														
	Lime loading/unloading	134 tons per day	1	--	24	0.05 lb/ton	6.7	Baghouse and enclosure	90%	0.67	11.7	1.51E-05	0.08	7
	ANFO loading/unloading	28 tons per day	1	--	24	0.02 lb/ton	0.6	Enclosure	99%	0.006	0.097	1.25E-07	0.001	8
	Drilling	60 holes/pit/day	2 pits	21,360 holes/pit/yr	24	0.071 lb/hole	9	Wet drilling, whose efficiency is accounted for in the emission factor.		9	0.7	9.65E-07	1.52	9
	Blasting	1 blast/pit/day	2 pits	150 blasts/pit/yr	24	10.95 lb/blast	22	--	0%	22	1.9	2.48E-06	1.64	10
SUBTOTAL - MISCELLANEOUS EMISSIONS							38			31.1	--	--	3.2	
Disturbed Areas: Drilling, Overburden Loading and Placement, Ore Loading and Placement, and Drainage Construction														
	Shoveling overburden and loading ore	152,809 tons/day	2 dumps/trip	--	24	1.89E-04 lb/ton	95	(3)	80%	19.1	0.4	4.67E-07	1.13	3,11
	Track Dozing	19.44 hours/day	5 dozers	97.2 vice-hrs/day		0.87 lb/device-hour	85	(3)	80%	16.9	0.91	1.47E-06	3.01	3,12,13
	Rubber-Tire Dozing	19.44 hours/day	2 dozers	38.9 vice-hrs/day		0.87 lb/device-hour	34	(3)	80%	6.8	0.3	4.10E-07	1.20	3,14
SUBTOTAL - DISTURBED AREA EMISSIONS							214			43	--	--	5	
Wind Erosion: Drilling, Overburden Loading and Placement, Ore Loading and Placement, and Drainage Construction Areas														
	Wind Erosion	24 hours/day	52.9 acres	--		3.2 lb/acre-day	167	(3)	80%	33	0.6	8.20E-07	5.96	3,15
SUBTOTAL - WIND EROSION EMISSIONS							167			33	--	--	6	
TOTAL FUGITIVE PM10 EMISSIONS							11,237			2,277	--	--	280	

TABLE 4.1.8-5A
ONSITE FUGITIVE PM_{10} EMISSIONS WITHOUT DRAINAGE CONSTRUCTION (1)
MESQUITE MINE EXPANSION

– = Not applicable.

1) Road fugitive dust is simulated in the ISC3 model as a series of volume sources with emission rates in grams per second (g/sec). Construction disturbance and wind erosion fugitive dust is simulated as a set of area sources with emission rates in g/sec per square meter.

2) Emission factor taken from SCAQMD, CEQA Air Quality Handbook, November 1993.

3) Unpaved road control efficiency of 80% achieved after 5 biweekly applications of 0.18 gallons of chemical suppressant solution/sq.yd containing 1 part chemical to 5 parts water. The resulting ground inventory of 0.15 gal. chemical/sq.yd. exceeds the 0.13 gal chemical/sq.yd. needed to achieve 80%. Regular watering program of 0.18 gal/sq.yd every 45 minutes would be continued to conservatively assure that 80% control efficiency is achieved. Same efficiency is achieved for PM10 control on disturbed and wind erosion areas through use of chemical suppressants with same protocol.

4) Maximum scenario day is calculated by multiplying the average day that achieves the annual permitted production of 60 million tons by the following factor: 1.5

5) Motor grader is conservatively assumed to make a daily pass over the roads between the mining area and the placement areas for overburden/interburden and ore. Speed assumed to be 6 mph. Grader use does not increase for maximum scenario day.

6) Each service, small-medium, and medium truck is conservatively assumed to make one daily 16,000-foot (one-way) trip between the maintenance area and the East Rainbow North Overburden/Interburden Storage Area. Use of these trucks does not increase for maximum scenario day.

7) Emission factor is for uncontrolled emissions (USEPA, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, PB86-124906 Part 2 of 2, Chapter 8.10: Concrete Batching, Table 8.10-1, February 1972). Activity area assumed to be 50-foot square. The concrete batching dust as TSP is assumed to be 50% PM_{10}. Base emission rate of 10,860 tpy for 1998 production of 24 million tons taken from Newmont Gold Company (1998), and assumed to occur over 304 working days.

8) Emission factor is for uncontrolled emissions (USEPA, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Chapter 8.3: Ammonium Nitrate, Table 8.3-2, July 1993.). Activity area assumed to be 50-foot square. Base emission rate of 2,250 tpy for 1998 production of 24 million tons taken from Newmont Gold Company (1998).

9) Emission factor is for controlled wet drilling (see Appendix A). Activity area assumed to be same 500-foot square used for blasting in each of Rainbow and Big Chief Pits. Holes/pit/day based on wider spacing than in the past.

10) Emission factor is for uncontrolled blasting (see Appendix A). Activity area assumed to be same 500-foot square used for drilling in each of Rainbow and Big Chief Pits.

11) Fugitive dust created by shoveling and loading haul trucks doubled to account for truck dumping at storage areas and leach pad. Emission factor from SCAQMD, CEQA Air Quality Handbook, Table A9-9-G, November 1993 (See Appendix A).

12) Availability of 90% and utilization of 90% result in 19.44 hours of usable time. Area = 500-foot square.

13) Track dozers used at three 500-foot square areas (two overburden storage areas and one leach pad) and 80 ft by 700 ft drainage construction area.

14) Two 834B rubber-tired dozers used predominantly. Two 824C rubber-tired dozers hardly used at all.

15) Wind erosion emission factor based on overburden silt content = 7.5%, wind speed greater than 12 mph during 16.4% of the time (according to meteorological data set used in modeling), and 21.9% of total dust is PM10. Emission factor equation is from SCAQMD CEQA Air Quality Handbook, Table A9-9-E, November 1993 (See Air Quality Appendix A).

TABLE 4.1.8-5B
ONSITE FUGITIVE PM10 EMISSIONS WITH DRAINAGE CONSTRUCTION (1)
MESQUITE MINE EXPANSION

Source Category	Source Description	No. units	Round-Trip Distance per Unit (miles)	Daily Vehicle Miles Traveled (miles)	Hours Per Day	Uncontrolled Emission Factor	Uncontrolled Emission Rate (lb/day)	Control Technique	Control Efficiency (%)	Controlled Emission Rate Max. Day (lb/day)	Max. Day (g/sec)	Annual (g/sec)	Annual (tons/yr)	Notes
Paved Road: Property line to administration area (Distance = 200 yards).														
	Employee Vehicles	92	0.23	21 vmt/day	24	0.330 lb/vmt	6.9	None	0%	6.90	0.0362	0.0362	1.2	2
	Delivery Vehicles	10	0.23	2 vmt/day	24	0.368 lb/vmt	0.8	None	0%	0.84	0.0044	0.0044	0.15	2
SUBTOTAL - PAVED ROAD EMISSIONS							7.7			7.7	0.041	0.041	1.38	
Unpaved Roads														
	Haul Truck	--	--	7020 vmt/day	24	2.10 lb/vmt	14,717	(3)	80%	2,943	15.5	10.3	349.3	3,4
	Motor Grader	4	4.3	17 vmt/day	24	0.05 lb/vmt	0.90	(3)	80%	0.2	0.0009	0.0009	0.032	3,5
	Service Truck (diesel)	13	6.1	79 vmt/day	24	2.12 lb/vmt	167	(3)	80%	33.4	0.175	0.175	5.9	3,6
	Small-Med. Truck (gasoline)	48	6.1	261 vmt/day	24	1.41 lb/vmt	368	(3)	80%	73.6	0.386	0.386	13.1	3,4
	Medium Truck (diesel)	10	6.1	61 vmt/day	24	2.12 lb/vmt	128	(3)	80%	25.7	0.135	0.135	4.6	3,4
SUBTOTAL - UNPAVED ROAD EMISSIONS							15,381			3,076	16	11.0	372.9	

Source Category	Source Description	Amount	No. units	Activity Intensity	Hours Per Day	Uncontrolled Emission Factor	Uncontrolled Emission Rate (lb/day)	Control Technique	Control Efficiency (%)	Controlled Emission Rate Maximum Day (lb/day)	Maximum Day (lb/day-acre)	Maximum Day (g/sec-m^2)	Annual tons/year	Notes
Miscellaneous														
	Lime loading/unloading	134 tons per day	1	--	24	0.05 lb/ton	6.7	Baghouse and enclosure	90%	0.67	11.7	1.51E-05	0.08	7
	ANFO loading/unloading	28 tons per day	1	--	24	0.02 lb/ton	0.6	Enclosure	99%	0.006	0.097	1.25E-07	0.001	8
	Drilling	60 holes/pit/day	2 pits	21,360 holes/pit/yr	24	0.071 lb/hole	9	Wet drilling, whose efficiency is accounted for in the emission factor.		9	0.7	9.65E-07	1.52	9
	Blasting	1 blasts/pit/day	2 pits	150 blasts/pit/yr	24	10.95 lb/blast	22	--	0%	22	1.9	2.48E-06	1.64	10
SUBTOTAL - MISCELLANEOUS EMISSIONS							38			31.1	--	--	3.2	
Disturbed Areas: Drilling, Overburden Loading and Placement, Ore Loading and Placement, and Drainage Construction														
	Shoveling overburden and loading ore	252,809 tons/day	2 dumps/trip	--	24	1.85E-04 lb/ton	95	(3)	80%	19.1	0.4	4.67E-07	1.13	3,11
	Track Dozing	19.44 hours/day	5 dozers	97.2 device-hrs/day		0.87 lb/device-hour	85	(3)	80%	16.9	0.91	1.47E-06	3.01	3,12,13
	Rubber-Tire Dozing	19.44 hours/day	2 dozers	38.9 device-hrs/day		0.87 lb/device-hour	34	(3)	80%	6.8	0.3	4.10E-07	1.20	3,14
SUBTOTAL - DISTURBED AREA EMISSIONS							214			43	--	--	5	
Wind Erosion: Drilling, Overburden Loading and Placement, Ore Loading and Placement, and Drainage Construction Areas														
	Wind Erosion	24 hours/day	52.9 acres	--		3.2 lb/acre-day	167	(3)	80%	33	0.6	8.20E-07	5.96	3,15
SUBTOTAL - WIND EROSION EMISSIONS							167			33	--	--	6	
TOTAL FUGITIVE PM10 EMISSIONS							15,807			3,191	--	--	389	

TABLE 4.1.8-5B
ONSITE FUGITIVE PM$_{10}$ EMISSIONS WITH DRAINAGE CONSTRUCTION (1)
MESQUITE MINE EXPANSION

-- = Not applicable.

1) Road fugitive dust is simulated in the ISC3 model as a series of volume sources with emission rates in grams per second (g/sec). Construction disturbance and wind erosion fugitive dust is simulated as area sources with emission rates in g/sec per square meter.

2) Emission factor taken from SCAQMD, CEQA Air Quality Handbook, November 1993.

3) Unpaved road control efficiency of 80% achieved after 5 biweekly applications of 0.11 gallons of chemical suppressant solution/sq.yd containing 1 part chemical to 5 parts water. The resulting ground inventory of 0.15 gal. chemical/sq.yd. exceeds the 0.13 gal chemical/sq.yd. needed to achieve 80%. Regular watering program of 0.18 gal/sq.yd every 45 minutes would be continued to conservatively assure that 80% control efficiency is achieved. Same efficiency is achieved for PM10 control on disturbed and wind erosion areas through use of chemical suppressants with same protocol.

4) Maximum scenario day is calculated by multiplying the average day that achieves the annual permitted production of 60 million tons by the following factor: 1.5

5) Motor grader is conservatively assumed to make a daily pass over the roads between the mining area and the placement areas for overburden/interburden and ore. Speed assumed to be 6 mph. Grader use does not increase for maximum scenario day.

6) Each service, small-medium, and medium truck is conservatively assumed to make one daily 16,000-foot (one-way) trip between the maintenance area and the East Rainbow North Overburden/Interburden Storage Area. Use of these trucks does not increase for maximum scenario day.

7) Emission factor is for uncontrolled emissions (USEPA, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, PB86-124906 Part 2 of 2, Chapter 8.10: Concrete Batching, Table 8.10-1, February 1972). Activity area assumed to be 50-foot square. The concrete batching dust as TSP is assumed to be 50% PM10. Base emission rate of 10,860 tpy for 1998 production of 24 million tons taken from Newmont Gold Company (1998), and assumed to occur over 304 working days.

8) Emission factor is for uncontrolled emissions (USEPA, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Chapter 8.3: Ammonium Nitrate, Table 8.3-2, July 1993.). Activity area assumed to be 50-foot square. Base emission rate of 2,250 tpy for 1998 production of 24 million tons taken from Newmont Gold Company (1998).

9) Emission factor is for controlled wet drilling (see Appendix A). Activity area assumed to be same 500-foot square used for blasting in each of Rainbow and Big Chief Pits. Holes/pit/day based on wider spacing than in the past.

10) Emission factor is for uncontrolled blasting (see Appendix A). Activity area assumed to be same 500-foot square used for drilling in each of Rainbow and Big Chief Pits.

11) Fugitive dust created by shoveling and loading haul trucks doubled to account for truck dumping at storage areas and leach pad. Emission factor from SCAQMD, CEQA Air Quality Handbook, Table A9-9-G, November 1993 (See Appendix A).

12) Availability of 90% and utilization of 90% result in 19.44 hours of usable time. Area = 500-foot square.

13) Track dozers used at three 500-foot square areas (two overburden storage areas and one leach pad) and 80 ft by 700 ft drainage construction area.

14) Two 834B rubber-tired dozers used predominantly. Two 824C rubber-tired dozers hardly used at all.

15) Wind erosion emission factor based on overburden silt content = 7.5%, wind speed greater than 12 mph during 16.4% of the time (according to meteorological data set used in modeling), and 21.9% of total dust is PM10. Emission factor equation is from SCAQMD CEQA Air Quality Handbook, Table A9-9-E, November 1993 (See Air Quality Appendix A).

surface layer. Other protocols developed by the mine or suggested by vendors of chemical dust suppressants could also be used.

The current regular watering program would be continued to assure that the combination of controls would conservatively achieve 80 percent efficiency of removing fugitive PM_{10} from the travel of vehicles on the unpaved haul roads.

4.1.8.4 Measures of Significant Impacts

Determination of level of significance requires that criteria be defined. Significance criteria used in this air quality analysis are presented separately for criteria and noncriteria pollutants.

Criteria Air Pollutants

Criteria pollutant air quality impacts resulting from the Proposed Action would be considered significant if any of the following might occur:

- Violation of CAAQS or NAAQS.
- Substantial contribution to an existing or projected violation of CAAQS or NAAQS.
- Contribution to a delay in attainment of a CAAQS or NAAQS according to an CARB-approved Air Quality Attainment Plan (AQAP).
- Determination that the Proposed Action is inconsistent with CARB-approved AQAP (including visibility protection).

Noncriteria Pollutants

Noncriteria pollutants can potentially cause three types of health risk: carcinogenic, and noncarcinogenic (chronic and acute). Carcinogenic and chronic noncarcinogenic risks are long-term and are based on annual arithmetic mean ambient air quality concentrations, while acute noncarcinogenic risk is short-term, and based on one-hour average concentrations.

A carcinogenic health risk is assumed significant if the probability of noncriteria pollutants causing excess cancer over a lifetime at a receptor site where people reside exceeds one in one hundred thousand (i.e., 10 in 1 million). A chronic or acute risk is assumed significant if the health hazard index for either type risk exceeds 1.0 at a receptor site where people can be exposed. The health hazard index for a non criteria pollutant is defined as the ratio of the maximum offsite concentration, and the reference exposure level. The chronic health hazard index is based on the maximum annual arithmetic mean concentration, and the acute health hazard index is based on the maximum one-hour concentration. The total health hazard index is equal to the sum of the individual pollutant health hazard indices.

The context for health risk in this analysis is the population available for potential health effects and the guidance provided in CAPCOA (1993).

In this remote project location, the three following situations were assumed to represent potential population exposure:

- Exposure of a population of 10 persons at Glamis, approximately 5 miles from the mine. This situation represents a maximum case exposure of recreational populations playing in the sand dunes near Glamis (i.e., the recreationalists would not be subject to long-term continuous exposure).

- Individuals traveling on SR 78 exposed for 6 minutes (3 minutes each direction), 240 days per year for 46 years.

- Fourteen days exposure of campers consisting of four individuals located adjacent to the north or west property boundary. Camping in one location is allowed for only 14 consecutive days, according to BLM regulations.

4.1.8.5 Impacts of Proposed Action

Introduction

The first step in the assessment of potential impacts of the Proposed Action is to determine if the emissions described in the previous section require specific actions under federal, state and district rules and regulations. The Proposed Action was reviewed for applicability of requirements in District Rule 207 (New and Modified Stationary Source Review).

The Proposed Action already complies with NSR BACT requirements as follows:

- Stationary Sources
  - The electric smelting furnace has a baghouse control system.
  - The carbon kiln and boiler burn LPG, a clean fuel.
  - The two lime silos are loaded while using a baghouse control system.
  - The lime silos are unloaded within an enclosure.
  - The ANFO silo is enclosed.

- Fugitive PM_{10} Sources
  - Unpaved roads and disturbed activity areas are watered frequently.

The Proposed Action would not require the acquisition of offsets because the net emission rate increase of each nonattainment pollutant or precursor is less than the applicable threshold of 137 lbs/day. In fact, total emissions (Tables 4.1.8-3 through 4.1.8-5B) will continue to be associated

with a production rate of 60 million tons per year of overburden/interburden and ore. This production rate and its associated emissions were already permitted by the District in 1996.

The Proposed Action would not require issuance of a PSD permit because the stationary source emission rate increase of each attainment pollutant would be less than the threshold of 250 tons per year. Similarly, the Proposed Action would not trigger requirements for a Title V Federal Operating Permit.

The Proposed Action would not require specific actions under the state Air Toxics "Hot Spots" Information and Assessment Act because the permitted emissions of noncriteria pollutants would not change, and hence, recordkeeping and reporting that is already in place would not change.

The CEQA requirement for analysis of air quality impacts is satisfied by the use herein of an appropriate EPA-approved air dispersion model to compute ground-level ambient air quality concentrations at and beyond the facility boundary.

Air Quality Impact Analysis Methodology

The EPA-approved air quality dispersion model used to assess potential impacts on ambient air quality of the Proposed Action is based on a fundamental mathematical description of atmospheric processes in which ground-level ambient air quality concentration at a receptor is related to emission rates from a set of sources. The potentially highest concentration is computed from the maximum scenario emission rates presented in Section 4.1.8.3 and actual meteorological conditions that affect dispersion during each of the 8,760 hours in one year (April 1, 1991-March 31, 1992).

The basic model equation used in this analysis assumes that the concentration of an emitted substance at any location downwind of a point source such as a stack can be determined by a Gaussian distribution about the centerline of the plume from the following equation:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2\left(y/\sigma_y\right)^2}\right) * \left(e^{-1/2\left(\frac{z-H}{\sigma_z}\right)^2} + e^{-1/2\left(\frac{z+H}{\sigma_z}\right)^2}\right)$$

where:

$C_{(x,y,z,H)}$ = concentration of a pollutant at the specified position in the atmosphere $[ML^{-3}]$[3] $(\mu g/m^3)$[4]

Q = pollutant emission rate $[M\ T^{-1}]$ (grams/second)

σ_y, σ_z = transverse and vertical dispersion coefficients, respectively, at downwind distance x [L] (meters)

[3] Brackets [ ] show dimensions of the parameter (e.g., M = mass, L = length, and T = time).

[4] Parentheses ( ) give example units.

u	=	wind speed at the height of the plume centerline [LT^{-1}](m/s)
x,y,z	=	the three-dimensional Cartesian coordinates for downwind, crosswind, and vertical distances from the base of the stack (as shown in Figure 4.1.8-2 [L] (meters)
H	=	height of the plume above the stack base, which is the sum of the height of the stack and the vertical distance that the plume rises due to its momentum and buoyancy [L] (meters)

This fundamental relationship is conservative; hence, Gaussian dispersion models approved by EPA for regulatory use overpredict actual impacts.

The model, Industrial Source Complex, Short-Term Model (ISCST3, Version 99155), is capable of assessing impacts from a variety of sources in regions of simple(5), intermediate(6), and complex terrain.(7) ISCST3 can account for settling and dry deposition of particulate; multiple point, area, line, and volume sources; plume rise as a function of downwind distance; and elevated receptors. The model is capable of estimating concentrations for averaging times ranging from 1 hour to 1 year.

Inputs required by the ISCST3 model include the following:

- Model Options
- Meteorological Data (1 year)
- Source Data
- Receptor Data

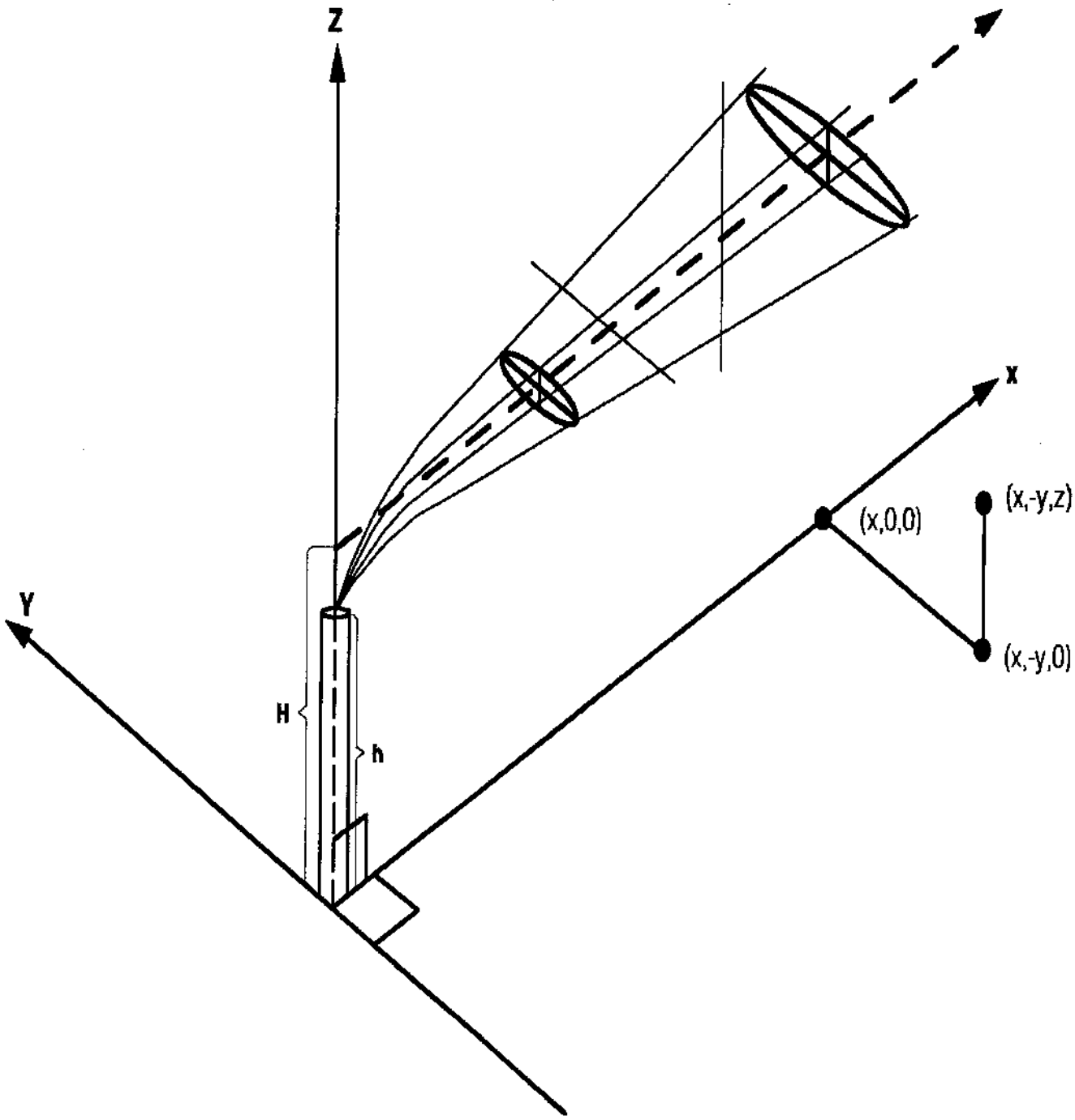
Model options refer to user selections that account for conditions specific to the area being modeled or to the emissions source that needs to be examined. Model options included in this air quality analysis are the following:

- CONC: concentrations are calculated
- RURAL: rural dispersion parameters are used
- MSGPRO: missing data are processed by an EPA routine

The model supplies recommended defaults on all other options. Some defaults must be selected to obtain EPA and District approval of model results. The EPA regulatory defaults are the following:

- Inclusion of stacktip downwash effects.
- Buoyancy-induced dispersion for heated effluent.
- Exclusion of calm meteorological conditions (wind speeds of less than 1 meter per second) from the dispersion calculations.

(5) Simple terrain means that elevations of receptors are below the top of the stacks of point stationary sources.
(6) Intermediate terrain refers to areas where receptor elevations are above stack height and below plume height.
(7) Complex terrain refers to areas where receptor locations are above plume height.



Coordinate system showing Gaussian distributions in the horizontal and vertical

SOURCE: TRC, 2000.

1/3/00

Mesquite Mine Expansion EIR/EIS

Gaussian Plume

FIGURE

4.1.8-2

ISCST3 is designed to use actual meteorological data. The EPA criteria for determining whether the meteorological data are representative are the following:

- Proximity of the meteorological monitoring site to the area under consideration.
- Complexity of the terrain.
- Exposure of the meteorological monitoring site.
- Period of time during which the data are collected.

The meteorological data used in this analysis meet the EPA criteria for representativeness, as follows:

- Proximity: The data were collected onsite.

- Complexity of Terrain and Exposure of Meteorological Monitoring Site: The terrain surrounding the meteorological station is the relatively gentle slope of the alluvial fan on which the Proposed Action is located. No terrain features would cause the meteorological data to be affected differently than the Proposed Action site; the exposure of the station and the Proposed Action are identical.

- Period of Data Collection: Wind speed and direction and other variables have been monitored at the meteorological station since 1984. Data for April 1, 1991 through March 31, 1992 were used in the air dispersion modeling for the Mesquite Regional Landfill, adjacent to the Proposed Action. Because the data were collected onsite, 1 year is sufficient under EPA guidelines. For consistency, the same data was used in the air dispersion modeling for the Proposed Action.

The required emission source data inputs to ISCST3 include source locations and elevations, and stack heights, diameters, exit temperatures, exit velocities, and emission rates. The source locations are specified in Cartesian (x,y) coordinates, where x and y are distances East and North respectively, of an origin placed outside of the southwest corner of the site boundary.

Squares in Figure 4.1.8-1 show the source locations for modeling blasting/drilling, overburden/interburden/ore digging with shovels, overburden/interburden/ore digging with loaders, overburden/interburden placement, ore placement, drainage construction, lime storage, and ANFO storage. The squares along haul roads mark the locations of volume sources used to simulate the exhaust from haul trucks, motor graders, and other vehicles.

Two hundred and seventy-five receptors were placed along the entire property line at a spacing of about 100 meters, shown as plus signs in Figure 4.1.8-1. Another set of 418 receptors, shown as labeled dots in Figure 4.1.8-1, form a 20 kilometer square grid with 1 km spacing outside the property boundary. These two sets of receptors, which together total 693, assure that the location of maximum potential offsite air quality impact is identified in the dispersion modeling.

Results of Ambient Air Quality Modeling

The emissions of NO_x by mobile source exhaust and stationary source combustion of LPG are treated by the dispersion modeling as if the initially generated nitric oxide (NO) completely converts to NO_2. In reality, the extent of conversion of high short-term concentrations of NO is limited by the locally available concentration of ozone. Ozone concentration at the mine was measured during a 1-year program between May 1992 and May 1993. The ozone limiting method (OLM, Cole and Summerhays, 1978, 1979) was used to combine these data with the ambient concentration of NO_2 predicted by the model for complete conversion. The resulting 1-hour NO_2 concentration is less than the 470 $\mu g/m^3$ AAQS, as shown in Table 4.1.8-6.

The receptors that receive the peak 24-hour PM_{10} and 1-hour NO_2 concentrations are indicated in Figure 4.1.8-3. These receptors are located along the northern portion of the east boundary, closest to the East Rainbow mining activities.

The estimated maximum concentration of NO_2 and other criteria pollutants from the Proposed Action are combined with background concentrations to obtain the total potential concentrations shown in Table 4.1.8-7. The total concentrations are less than AAQS, and hence, are less than significant air quality impacts as discussed in Section 4.1.8.4.

Health Risk Assessment

In this section the potential risks of air emissions to public health are assessed. The remote location of the site helps to minimize such risks. The nearest permanent habitation is the store at Glamis, where fewer than ten people live at a distance of approximately 4.3 miles from the southwest corner of the mine property, and are assumed to live there for 9.5 years, the average duration a resident in Imperial County lives in one residence (U.S. Bureau of the Census, 1990). The low volume of traffic that passes the mine on State Route 78 provides a low exposure of approximately 6 minutes duration, 5 days each week for non-mine commuters, who are assumed to work 240 days each of 46 years (California Air Pollution Control Officers Association [CAPCOA], 1993). A third possible public exposure would be the unlikely event of people camping next to the fence boundary for 14 days, the time limit set by U.S. Bureau of Land Management regulations.

Health risk is assessed with special concern for sensitive receptors. Sensitive receptors are groups of individuals including infants, children, the elderly and chronically ill, that may be more susceptible to health risks due to exposure to air pollution. Schools, daycare facilities, convalescent homes, and hospitals are of particular concern. The nearest sensitive receptors are at least 25 miles distant in Brawley, Holtville, and other communities in Imperial County.

This section presents the methodology and results of a human health risk assessment performed to assess potential impacts associated with airborne emissions from the construction and operation of the Proposed Action.

Health risk-related emissions to the air consist of criteria and noncriteria combustion byproducts mostly from diesel-fueled combustion, plus minor contributions from LPG-fired boilers and kiln, and

Table 4.1.8-6

NO_X Dispersion And Chemical Conversion By Ozone Limiting Method(1)
Mesquite Mine Expansion

Averaging Period	Concentration From Model(2)	Thermal Concentration(3)	Concentrations With Ozone Limiting Chemistry					Project Concentration ($\mu G/M^3$)(9)(10)	Total Concentration ($\mu G/M^3$)(11)(12)	Ambient Air Quality Standard ($\mu G/M^3$)
	NO_2	NO_2	NO(4)	NO(5)	O_3(6)	NO_2(7)	NO_2(8)	NO_2	NO_2	NO_2
	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	(ppbv)	(ppbv)	(ppbv)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1 HOUR	3,083	308.3	1,809.8	1,475.0	37.0	37.0	69.7	378.0	451.4	470

99-116/Tbls&Figs/Section 4.1.8 (3/2/00/ey)

(1) Cole, Henry S. and John E. Summerhays. *The Application of reactive plume models to the estimation of short-term NO_2 concentration*, presentation at the Annual Meeting of the Air Pollution Control Association, Houston, Texas, June 1978; and *A review of techniques available for estimating short-term NO_2 concentrations*, Journal of the Air Pollution Control Association, Volume 29, Number 8, pages 812-817, August 1979.

(2) This concentration is based on all NO emissions converting to NO_2 before reaching receptors. Thermal NO_2 assumed equal to 10 percent of modeled potential maximum NO_2 as recommended in Reference 1.

(3) Thermal NO_2 assumed equal to 10 percent of modeled potential maximum NO_2 as recommended in Reference 1.

(4) Molecular weight of NO (gram/gram-mole) = 30.01. Molecular weight of NO_2 (gram/gram-mole) = 46.01.

(5) Conversion factor for NO ($\mu g/m^3$ to ppbv) = 0.815.

(6) Background O_3 concentration is the annual arithmetic mean measured at Mesquite Mine well field during the 1-year period from May 1992 through May 1993 (ppbv) = 37.

(7) NO_2 concentration is limited to that of O_3 when latter is less than that of NO.

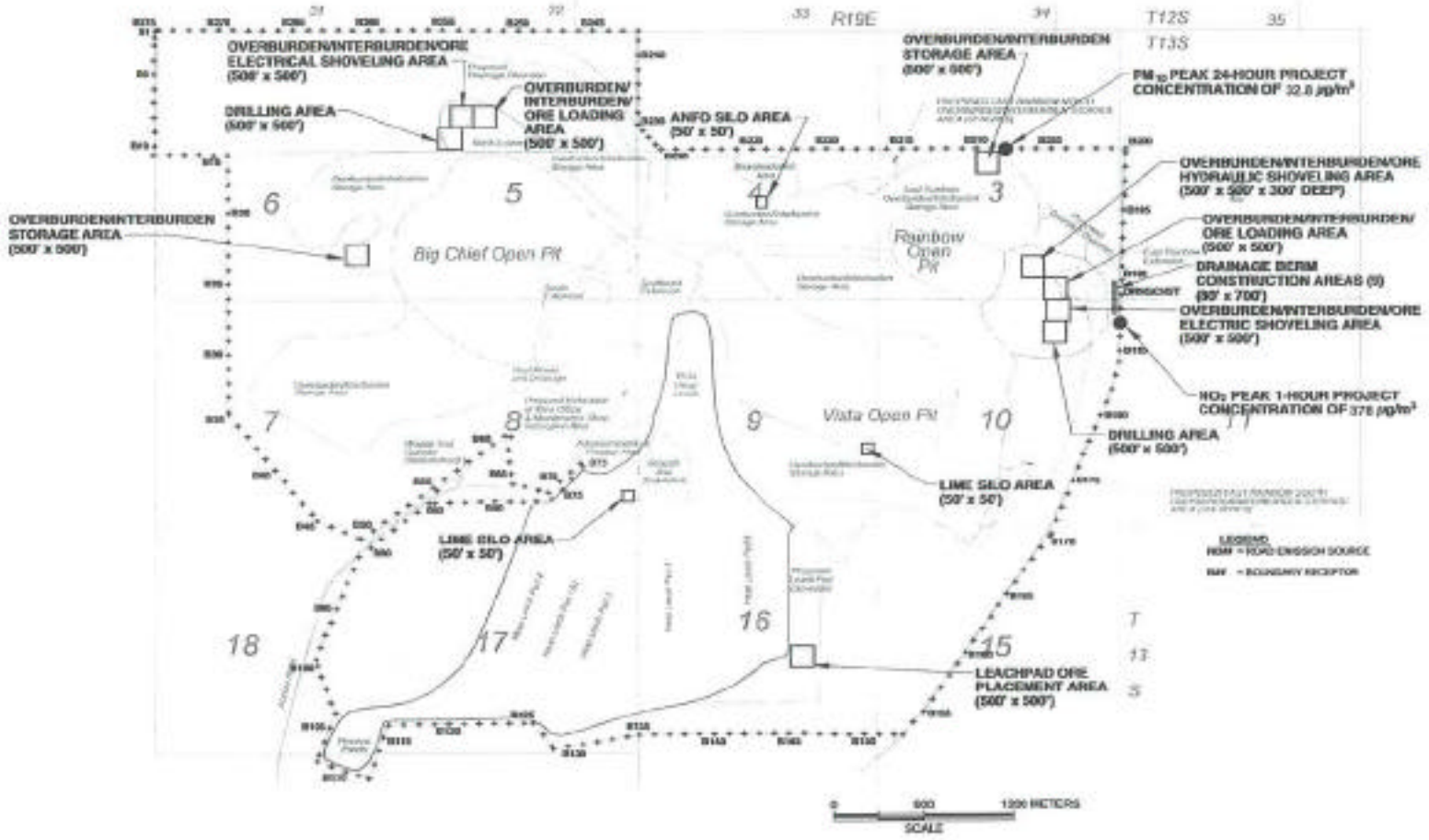
(8) Conversion factor for NO_2 ($\mu g/m^3$ to ppbv) = 0.531.

(9) Project 1-hour NO_2 concentration = thermal NO_2 + chemically-converted NO_2.

(10) Project annual NO_2 concentration = thermal NO_2 + chemically converted NO_2.

(11) Total 1-hour NO_2 concentration = Project 1-hr NO_2 conc. + max. 1-hr background NO_2 = thermal NO_2 + chemically-converted NO_2 + max. 1-hr background NO_2. Most conservative max. 1-hr background NO_2 concentration is the maximum measured at Mesquite Mine well field during the 1-yr period from May 1992 through May 1993 ($\mu g/m^3$) = 73.4.

(12) Total annual NO_2 concentration = thermal NO_2 + chemically converted NO_2 + annual average background NO_2. Annual average background NO_2 concentration is the annual arithmetic mean measured at Mesquite Mine well field during the 1-yr period from May 1992 through May 1993 ($\mu g/m^3$) = 5.6.



SOURCE: TRC, 1999.

Mesquite Mine Expansion EIR/EIS

Receptor Locations for Potential Maximum NO_2 and PM_{10} Concentrations

FIGURE 4.1.8-3

Table 4.1.8-7

Maximum Offsite Ground-Level Air Pollutant Concentrations(1)
Mesquite Mine Expansion

Pollutant	Averaging Period	Background Concentration ($\mu G/M^3$)	Maximum Project Concentration ($\mu G/M^3$)	Total Concentration ($\mu G/M^3$)	California Ambient Air Quality Standards ($\mu G/M^3$)	National Ambient Air Quality Standards ($\mu G/M^3$)	Significance
NO_2	1-hour	73.4(2)	378.0(3)	451.4	470	--	Insignificant
	Annual Arithmetic Mean	5.6(4)	10.9	16.5	--	100	Insignificant
SO_2	1-hour	Negligible	288	288	655	--	Insignificant
	3-hour	Negligible	275	275	--	1,300	Insignificant
	24-hour	Negligible	103	103	105	365	Insignificant
	Annual Arithmetic Mean	Negligible	1.1	1.1	--	80	Insignificant
CO	1-hour	Negligible	1,309	1,309	23,000	40,000	Insignificant
	8-hour	Negligible	1,178	1,178	10,000	10,000	Insignificant
PM_{10}	Annual Arithmetic Mean	18.8(5)	2.1	20.9	--	50	Insignificant
	Annual Geometric Mean	14.4(5)	2.1(7)	16.5	30	--	Insignificant
	24-hour	14.4(6)	32.8	47.2	50	150	Insignificant

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-- = None.

(1) Based on emissions from maximum scenario with drainage construction during December and January.

(2) Highest 1-hour concentration measured at Mesquite Mine well field on October 6, 1992, during a sampling program conducted from May 1992 through May 1993.

(3) Ozone limiting method (Cole and Summerhays, 1979) used to calculate $N0_2$ concentration.

(4) Annual arithmetic mean measured at Mesquite Mine well field during the period May 1992 through May 1993.

(5) Based on Mesquite Mine monitoring from 1997 through 1999 (see Table 3.1.8-11 in Section 3.1.8.4.3).

(6) Annual geometric mean is the appropriate background concentration to add to 24-hour maximum project concentration because the latter occurs under low wind speeds of 0.4 to 2.4 mph, while high 24-hour background concentrations occur only with high wind speeds.

(7) This is annual arithmetic mean maximum project PM_{10} concentration because ISCST3 does not calculate geometric mean.

evaporation of volatile compounds from diesel and gasoline storage tanks. After dispersion of these emissions to the ground-level locations of public receptors, inhalation is the main pathway by which emissions of these air pollutants can potentially cause public health impacts. The following other pathways were also evaluated for potential exposure:

- Dermal Absorption
- Soil Ingestion
- Water Ingestion
- Food Ingestion
  - Plants
  - Animal Products
  - Mother's Milk

As discussed below, the potential health risks of the Proposed Action are not significant.

Health Risk-Related Significance Criteria

Public health-related significance criteria were determined based on California Environmental Quality Act (CEQA) Guidelines, Appendix G, Environmental Checklist Form (approved January 1, 1999), and on performance standards and thresholds adopted by responsible agencies. A potential public health impact at the nearest receptor may be considered significant if the Proposed Action results in any of the following:

- Carcinogenic risk of 10^{-5} at any point on the boundary or offsite with application of Toxics-Best Available Control Technology (T-BACT) (SCAQMD, 1999).

- Chronic health hazard index of 1.0 (CAPCOA, 1993).

- Acute health hazard index of 1.0 (CAPCOA, 1993).

These significance criteria are discussed below in more detail for different types of impacts.

The methodology of analyzing public health impact is described below, including the development of an inventory of emissions of noncriteria pollutants, the dispersion modeling of these pollutants, calculation of potential health risks, and their comparison with significance criteria.

Carcinogenic Risk

Carcinogenic risk is the probability or chance of contracting cancer over a human life span, assumed to be 70 years. Any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the risk (i.e., a linear, no-threshold model). A 10-in-one-million risk is used by the SCAQMD, Assembly Bill (AB) 2588 program, and California's Proposition 65 as the threshold for further action (e.g., public notification). This same limit was used by Imperial County as the carcinogenic risk significance criterion in the HRA for the Mesquite Regional Landfill (BLM and the County of Imperial, 1994).

For perspective, the total risk of cancer from all causes in the United States today is about 250,000-in-one-million (or 25 percent), and the total risk of cancer from noncriteria air pollutants in the South Coast Air Basin is about 1,400 in one million (SCAQMD, 1999). Compared to voluntary risks, such as driving, cancer is an involuntary health risk. Environmental and occupational exposures are only a small portion of our involuntary risks. Yet environmental and occupational carcinogens are a principal focus of regulatory policy because exposures to these carcinogens are often involuntary, and, in principle, can be reduced by regulatory initiatives.

Noncarcinogenic Risk

Noncarcinogenic health effects can be either chronic or acute. Chronic toxicity is defined as adverse health effects from prolonged exposure to those noncriteria pollutants that can accumulate in the body. Because accumulation typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. In determining potential noncarcinogenic health risks from noncriteria pollutants, it is assumed that there is a concentration of each pollutant, the relative exposure level (REL), below which there would be no impact on human health. The lowest no-effect chronic exposure level for a noncarcinogenic noncriteria pollutant is the REL. Below this threshold, the body is capable of eliminating the pollutant rapidly enough to prevent its accumulation.

The chronic health hazard index is defined as the long-term (annual) concentration of the noncriteria pollutant divided by its chronic REL. The health hazard indices for chronic noncriteria pollutants that affect the same organ or system (e.g., respiratory system) are added to obtain the total chronic health hazard index for that organ or system. To be conservative in this health risk assessment, chronic health hazard indices for different organs were summed. The chronic RELs used in the hazard index calculations were those published in CAPCOA (1993). The significance threshold for total chronic health hazard index is 1.0.

Acute toxicity is defined as adverse health effects caused by a brief exposure to a noncriteria pollutant of no more than 24 hours. The air concentration required for a noncriteria pollutant to cause an acute effect is higher than the concentration required to cause a chronic effect because the duration of exposure is shorter. The acute health hazard index for each pollutant is defined as the short-term (e.g., 1-hour) concentration of the noncriteria pollutant divided by its acute REL. Because acute effects are predominantly manifested in one organ or system (i.e., respiratory system), acute health hazard indices for individual pollutants are summed to calculate the total acute health hazard index. The significance threshold for total acute health hazard index is 1.0. Acute RELs were taken from CAPCOA (1993), and updated according to the Office of Environmental Health Hazard Assessment (OEHHA, 1999).

Potential hazards were identified by evaluating noncriteria pollutants that will be emitted to the air, even if in small amounts. Diesel-fueled equipment will be the primary source of potential emissions of noncriteria pollutants. Table 4.1.8-8 presents a list of noncriteria pollutants that may potentially be emitted by the combustion of diesel fuel, gasoline, or LPG and storage of gasoline.

Table 4.1.8-8

Noncriteria Pollutants
Mesquite Mine Expansion

Pollutant	Sources				
	Diesel	Gasoline		LPG Exhaust	Other
	Exhaust	Vapor	Exhaust		
Acetaldehyde	(3)		(2)		
Acrolein	(7)				
Arsenic	(4)				
Benzene	(3)	(2)	(2)		
Chlorobenzene	(2)				
Copper	(4)				
Diesel exhaust particulate	(1)				
Formaldehyde	(3)		(2)	(2)	
Hydrogen Cyanide					(5)
Mercury	(4)				
Naphthalene	(3)				
Nickel	(4)				
Selenium	(4)				
Sodium Hydroxide					(6)
Sulfates				(4)	
Toluene	(3)	(2)	(2)		
Xylene	(3)	(2)	(2)		
Zinc	(4)				

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(1) ARB (1998).
(2) ARB (1991a).
(3) ARB (1999).
(4) ARB (1991b).
(5) Volatilization from leach pads
(6) Emitted from hot caustic used in electrowinning cell.
(7) CATEF 1.2. {TRC}

Diesel exhaust contains many substances, most of which are incorporated in the particulate. The particulate contains metals, polycyclic aromatic hydrocarbons, ammonia, chlorine and sulfates. Together these substances account for the carcinogenic effect of this particulate.

Diesel exhaust also contains volatile constituents, including acetaldehyde, benzene, chlorobenzene, formaldehyde, naphthalene, toluene, and xylene. Except for chlorobenzene and naphthalene, these same volatile constituents are in gasoline exhaust. LPG exhaust contains formaldehyde and sulfates.

The volatile constituents in gasoline vapor include benzene, toluene and xylene.

Sodium hydroxide droplets are assumed to make up the small amount of PM_{10} emitted from the hot caustic used in the electrowinning cell. The concentration of NaOH in these droplets is assumed to be the same 30 percent as in the hot solution.

The small amount of PM_{10} emitted from the electric induction furnace is generated by the heating of sludge containing gold and various other metals. The sludge is pressure washed off the steel wool used in the electrowinning cell where gold and these other metals are removed. Analyses of the solutions going into the electrowinning cell and leaving it allow determination of the relative amount of each metal in the sludge captured on the steel wool, and heated in the induction furnace. Air Quality Appendix A provides the calculation of the composition of PM_{10} emitted by the furnace.

Table 4.1.8-8 includes hydrogen cyanide that is vaporized in small amounts from the leach pads.

Criteria pollutants, discussed in earlier sections, also have potential health impacts, but were analyzed on a different basis. The EPA and CARB established AAQS to prevent adverse public health impacts, including a margin of safety to protect sensitive subgroups of the population. The Proposed Action would cause no significant adverse air quality impacts because expected ground-level concentrations of criteria pollutants are lower than AAQS.

Health Risk Assessment Methodology

The methodology used to assess potential human health risks follows generally-accepted practice as described in CAPCOA (1993). The health risk assessment was conducted in three steps. First, emissions of noncriteria pollutants from proposed sources were estimated. Second, dispersion modeling was used to compute the ground-level concentration of each noncriteria pollutant at defined boundary and offsite grid receptors. Third, carcinogenic unit risk factors and chronic and acute RELs were combined with the estimated concentrations to compute carcinogenic risk, and chronic and acute noncarcinogenic health hazard indices.

A health risk assessment model, ACE2588, was specifically developed by CAPCOA and the County of Santa Barbara (Applied Modeling, Incorporated, 1991) to combine dispersion modeling with health risk parameters (e.g., carcinogenic unit risk factor) to estimate health risks.

Emission Calculation Methodology

Emissions of noncriteria pollutants from the combustion of diesel fuel in internal combustion engines were calculated using emission factors from the California Air Toxics Emission Factor (CATEF) database (Version 1.2; California Air Resources Board [CARB], 1999). The volume of diesel fuel combusted in engines is shown in Tables 4.1.8-2A, 4.1.8-2B and 4.1.8-3, and in Air Quality Appendix A. The mass of gasoline volatilized from its storage tank is shown in Table 4.1.8-3.

One hour and annual emissions of noncriteria pollutants from onsite sources are shown in Table 4.1.8-9 for the maximum scenario described in Sections 4.1.8.2 and 4.1.8.3. The emission rate of hydrogen cyanide (i.e., hydrocyanic acid, HCN) from the leach pads is calculated in detail in Air Quality Appendix A. The calculation is based on the fundamental assumption that the evaporation rate of HCN from the leachpads is proportional to the evaporation rate of water from the solution used to leach the ore in the pads times the ratio of the HCN vapor pressure gradient to the H_2O vapor pressure gradient. The HCN vapor pressure gradient was determined by a field study (Environmental Solutions, Inc., 1991). The 1990 water evaporation rate of 115 million gallons per year was adjusted to 45.4 million gallons per year, estimated to be the maximum to process 25 million tons of ore per year in the Proposed Action. The HCN vapor pressure gradient was reduced to account for the increase in leach solution pH from 9.8 in 1990 to 10.03 in 1999. These adjustments result in an emission rate of 0.46 pounds HCN per hour for the Proposed Action.

One reason the water consumption decreased substantially since 1990 was the cessation of crushing in 1997. Part of the water pumped from the underground aquifer was used on the ore in the crushing circuit. Other parts of the pumped water are used on the leach pads and unpaved roads.

Other reasons that the water consumption rate will be lower during the Proposed Action than in recent years are the following:

- New ore was leached at the same time that old ore was releached during recent years, thus requiring more water.
- Only a limited area, needed for new ore, will be used for leaching during the Proposed Action; and,
- Increased production of ore during the Proposed Action, up from 14 million tons in 1999 to a possible 25 million per year, would be placed on the limited area of leach pads, thereby holding down the amount of water evaporated

The cancer unit risk factors and the chronic and acute RELs were obtained from CAPCOA (1993), CARB (2000) and OEHHA (1999), and are listed in Table 4.1.8-10. The maximum 1-hour emission rate in Table 4.1.8-9 is used to calculate the maximum ground-level concentration for each noncriteria pollutant having an acute REL listed in Table 4.1.8-10. Similarly, the maximum annual emission rate in Table 4.1.8-9 is used to calculate the maximum annual concentration for each noncriteria pollutant having a unit risk factor or chronic REL listed in Table 4.1.8-10.

Table 4.1.8-9

Maximum Scenario Emissions of Noncriteria Pollutants Mesquite Mine Expansion

Noncriteria Pollutant	Emission Rate	
	Hourly (lbs per hour)	Annual (lbs per year)
Acetaldehyde	0.38	2,240
Acrolein	4.5E-03	26.3
Arsenic	3.4E-05	0.30
Benzene	0.227	1,340
Chlorobenzene	9.0E-03	52.9
Copper	9.8E-04	8.6
Diesel exhaust particulate	14.7	86,170
Formaldehyde	1.13	6,630
Hydrogen Cyanide	0.46	4,030
Mercury	1.3E-06	0.012
Naphthalene	1.75E-03	15.3
Nickel	1.8E-04	1.6
Selenium	5.1E-05	0.45
Sodium Hydroxide	0.025	223
Sulfates	6.0E-04	5.5
Toluene	0.23	1,350
Xylene	0.036	214
Zinc	1.0E-05	0.090

99-116 (3/6/00/rm)

Source: TRC 2000. <TRC>

Table 4.1.8-10

Carcinogenic Unit Risk Factors and Reference Exposure Levels For Noncriteria Pollutants Mesquite Mine Expansion

Noncriteria Pollutant	Carcinogenic Unit Risk Factor(1) $(\mu G/M^3)^{-1}$	Reference Exposure Level (Rel) $(\mu G/M^3)$	
		Chronic (1)	Acute(2)
Acetaldehyde	2.7E-06	9.0	--
Acrolein	2.9E-5	1,300	71
Arsenic	3.3E-03	0.50	0.19
Benzene	2.9E-05	71	1,300
Chlorobenzene	--	70	--
Copper	--	2.4	100
Diesel exhaust particulate	3.0E-04	5 (3)	--
Formaldehyde	6.0E-06	3.6	94
Hydrogen Cyanide	--	70	340
Mercury	--	0.30	1.8
Naphthalene	--	14	--
Nickel	2.6E-04	0.24	6.0
Selenium	--	0.50	--
Sodium Hydroxide	--	4.8	8.0
Sulfates	--	25	120
Toluene	--	200	37,000
Xylenes	--	300	22,000
Zinc	--	35	--

99-116 (3/2/00/ey)

Source: TRC 2000

-- = None available.
(1) CAPCOA (1993); ARB (2000) for diesel exhaust particulate.
(2) OEHHA (1999a).
(3) OEHHA (1998) <TRC>

HRA Dispersion Modeling Methodology

Noncriteria pollutant emission rates, calculated as described, were combined with other input information (e.g., release height) to run a dispersion model. ISCST3 was again used to compute ground-level concentrations at the receptors shown in Figure 4.1.8-1. The hourly meteorological data used in the model are the same as used in the criteria pollutant analysis discussed above.

The dispersion model computed the maximum hourly and annual arithmetic mean concentrations of each noncriteria pollutant at each receptor. The maximum 1-hour and annual offsite concentrations are listed in Table 4.1.8-11.

Calculation of Health Effects

Carcinogenic risk was computed by multiplying the modeled maximum annual concentration of each noncriteria pollutant in Table 4.1.8-11 by its unit risk factor in Table 4.1.8-10, and summing the resultant risks from all noncriteria pollutants. Chronic and acute health hazard indices were computed by dividing the maximum annual and 1-hour concentrations, respectively, in Table 4.1.8-11 by the chronic and acute RELs in Table 4.1.8-10. The indices for the individual pollutants were summed to obtain total chronic and acute health hazard indices.

The use of EPA-approved dispersion modeling and CAPCOA health risk assessment methodology provides an upper-bound estimate of potential risks. Actual risks would be substantially lower because the carcinogenic unit risk factors are determined from toxicological evidence of effects observed at the lowest concentrations, after which a safety factor of 10 to 1,000 is added.

For the few people who live at the Glamis Beach Store, the assumption was made that they would be continuously exposed to the computed concentrations 24 hours every day for 9.5 years. This period of time was determined by the U.S. Census (2000) in 1990 to be the median duration of a person in his/her residence in Imperial County, California. Use of the median duration for Imperial County is conservative because the Glamis Beach Store is not a regular residence. The store is a business in a remote location, where a few people associated with retail sales live as a convenience. The median residence time in a home in Imperial County is substantially longer than the national average of 7.1 years (National Association of Realtors, 1993).

At the north and west boundary receptors, where the public might conceivably camp outside the fence, maximum potential health risks were adjusted from these same conservative assumptions by the ratio of 14 days to 70 years to obtain risks appropriate to camping on BLM land in compliance with their regulations. The maximum acute health hazard index was set by boundary receptors that lie along the exterior boundary (e.g., B90 in Figure 4.1.8-1), not along the access road that penetrates the property (see B73 in Figure 4.1.8-1).

Table 4.1.8-11

Maximum Scenario
Offsite Ground-Level Concentrations
of Noncriteria Pollutants
Mesquite Mine Expansion

Noncriteria Pollutant	Maximum Offsite Ground-Level Concentration ($\mu G/M^3$)	
	1-Hour	Annual
Acetaldehyde	2.79	0.126
Acrolein	9.69E-5	1.98E-6
Arsenic	1.83E-03	1.52E-05
Benzene	1.63	0.0736
Chlorobenzene	0.0658	2.96E-03
Copper	0.0521	4.33E-04
Diesel exhaust particulate	109	4.82
Formaldehyde	8.25	0.371
Hydrogen Cyanide	0.433	0.0131
Mercury	7.12E-05	5.91E-07
Naphthalene	0.142	9.40E-04
Nickel	9.88E-03	8.19E-05
Selenium	2.74E-03	2.27E-05
Sodium Hydroxide	9.41	4.76E-02
Sulfates	0.102	7.89E-04
Toluene	1.65	0.0743
Xylene	0.263	0.012
Zinc	5.51E-04	4.57E-06

99-116 (3/2/00/ey)

Source: TRC 2000

Health risks at the south and east boundary receptors along State Route 78 were adjusted from the conservative assumptions by the following ratios:

- 46-year working lifetime/
  70-year total lifetime
- 240 working days per year
  365 total days per year
- 6 commuting minutes (next to mine) per day
  24 total hours per day

HRA Results

The results are presented separately for the potential carcinogenic and noncarcinogenic impacts of the emitted noncriteria pollutants. The potential health effects of criteria pollutant emissions are then discussed relative to ambient air quality standards.

Estimated Carcinogenic Risks

Table 4.1.8-12 presents the maximum offsite carcinogenic risk from the Proposed Action. Compared to the significance criterion of 10^{-5}, the carcinogenic risk of each of the three cases are less than the 10-in-one-million threshold. The location of the maximum risk would potentially occur at Glamis Beach Store as shown in Figure 4.1.8-4. Thus, the Proposed Action poses an insignificant carcinogenic risk according to established regulatory guidelines.

Estimated Noncarcinogenic Risks

Table 4.1.8-12 presents the calculated maximum chronic hazard index, which was predicted to occur at Glamis Beach Store, the same location as the maximum, although insignificant, carcinogenic risk. This computed index is only about 0.06 percent of the significance criterion of 1.0.

Table 4.1.8-12 presents the calculated maximum acute hazard index of 0.20, which was predicted to occur at Boundary Receptor B90 location shown in Figure 4.1.8-4. This location is on the boundary surrounding the access road at the closest point where it is even conceivable that someone might consider camping. This index is one-fifth of the significance criterion of 1.0.

Because the chronic and acute health hazard indices are well below their significance criteria of 1.0, the Proposed Action will have no significant noncarcinogenic health effects.

Criteria Pollutants

Emissions of criteria pollutants from the maximum scenario of mine operation were modeled and evaluated for their impacts on air quality as discussed earlier. Maximum predicted concentrations from the Proposed Action were compared with the AAQS, which are concentration limits that protect the health of the most sensitive individuals, with a margin of safety, and also serve as inhalation RELs. Because modeling of NO_2, CO, SO_2 and PM_{10} indicate that these health-protective

Table 4.1.8-12

Maximum Potential Health Risks
Mesquite Mine Expansion

Receptor	Exposure Conditions	Carcinogenic Risk	Noncarcinogenic Risks	
			Chronic Hazard Index	Acute Hazard Index
Glamis Beach Store	9.5 years exposure [1]	7.4×10^{-6}	0.0006	0.03
North and West Property Boundary	14-Days [2]	8×10^{-7}	0.0006	0.20[3]
Along SR 78	6-Minute Daily Exposure, 240 Days per year for 46 years [4]	3×10^{-6}	0.0002	0.20
Significance Threshold		10^{-5}	1.0	1.0
Significance Level		Insignificant	Insignificant	Insignificant

Source: TRC, 2000

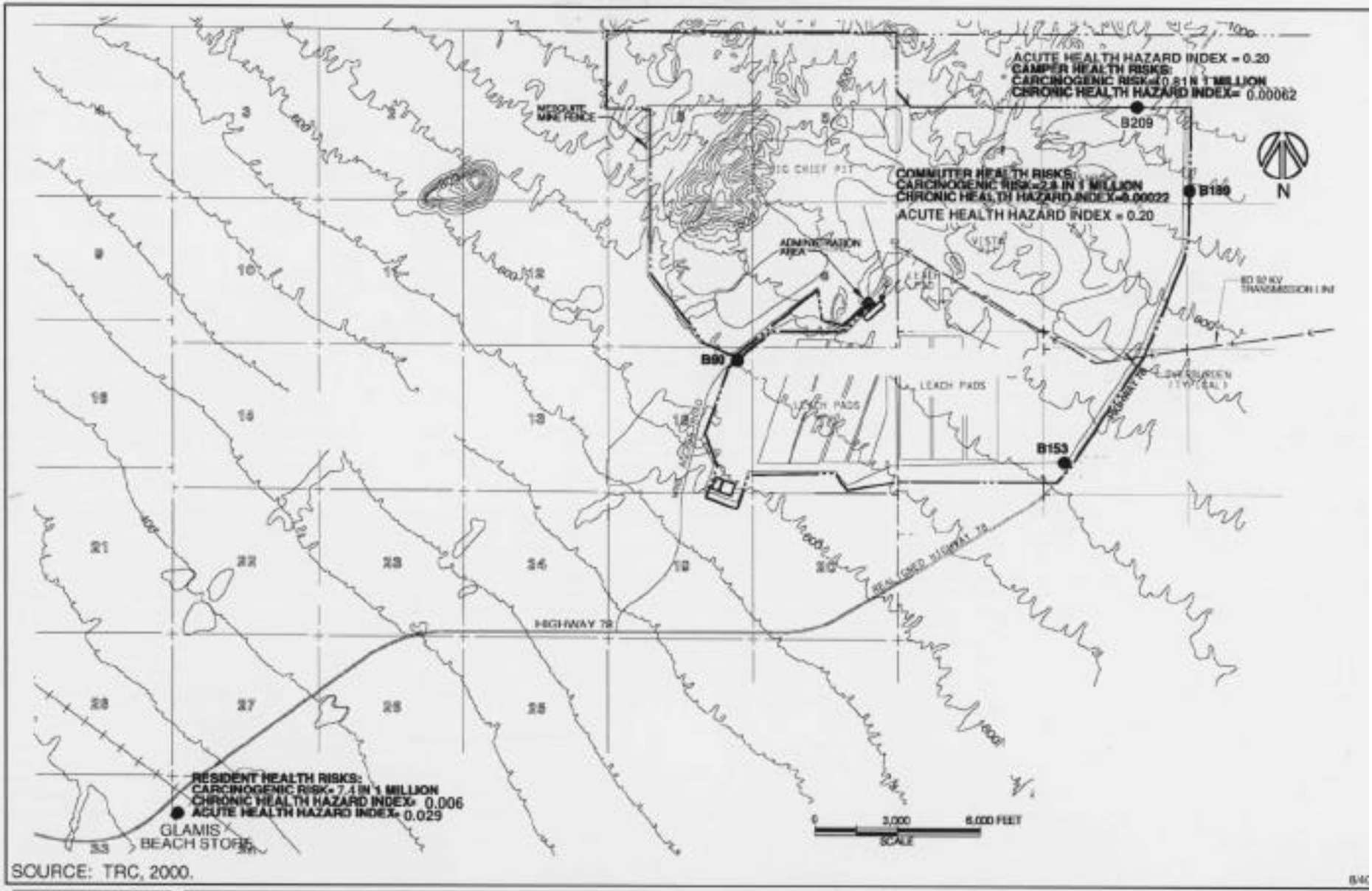
99-116 (3/2/00/ey)

(1) Carcinogenic risk and noncarcinogenic chronic health hazard index of Glamis Beach Store residents adjusted from 70 years by median duration of a person in current residence (9.5 years in Imperial County according to U.S. Census Bureau [1998]).

(2) Public lands north and west of the Proposed Action that are managed by the U.S. Bureau of Land Management are subject to a 14-day limit.

(3) Maximum acute health hazard index computed for those receptors on west and north boundaries where the public might conceivably camp next to an operating gold mine (i.e., Boundary Receptor B90 versus Receptor B73 in Figure 4.1.8-3).

(4) A commuter takes 3 minutes to round the southeast boundary of the mine when traveling 65 miles per hour on SR 78, hence the daily exposure for both trips between home and work is 6 minutes. A normal work year is 240 days, and the maximum expected owrking life of an individual 46 years.



SOURCE: TRC, 2000.

Mesquite Mine Expansion EIR/EIS

Receptor Locations for Maximum Potential Health Risks

FIGURE 4.1.8-4

standards are not exceeded, potential health effects from emission of criteria pollutants are below thresholds of significance.

Compliance with Regulatory Requirements

In this section the federal, state, and local district requirements described in Section 3.8.2 are shown to be satisfied.

The net total emission change for each nonattainment criteria pollutant is less than the threshold that requires a conformity determination by the BLM. The net change equals the sum of Proposed Action nonattainment emissions listed in Tables 4.1.8-3, 4.1.8-4 and 4.1.8-5B minus the sum of the current permit limit emissions listed in Tables 3.8-16 through 3.8-18. A summary of these emissions and the appropriate threshold for comparison is presented in Table 4.1.8-13. The net change in each applicable pollutant (i.e. NO_x, ROC, and PM_{10}) is less than the threshold for which a conformity determination would be required, and less than 10 percent of the nonattainment area inventory, above which requirements of the conformity regulations would apply.

Compliance With Federal Requirements

Air dispersion modeling demonstrated that ground-level concentrations of criteria pollutants, produced by the maximum scenario, at and beyond the property boundary would be less than NAAQS. New Source Review, as implemented by District Rule 207, confirmed compliance with applicable requirements. For example, offsets would not be required because stationary source emissions would not increase more than the District-allowed threshold. A PSD application would not be required because project emissions of attainment pollutants would not increase more than the 250-ton-per-year threshold.

None of the NESHAPs apply to gold ore mining and processing. As can be seen in Tables 4.1.8-3 and 4.1.8-5, potential stationary source emissions at the permitted processing rate of 60 million tons per year would be less than the 100-ton-per-year (tpy) Title V federal operating permit threshold for each criteria pollutant. Hazardous air pollutant (HAP) emissions from the stationary sources would also be less than the thresholds of 10 tpy for each HAP and 25 tpy for all HAPs together. Hence, a Title V permit application would not need to be filed as a result of this Proposed Action.

Consistency With State Requirements

As seen in Table 4.1.8-7, the ground-level criteria pollutant concentrations that would potentially be caused by the Proposed Action are less than relevant California Ambient Air Quality Standards. Because the potential emissions from the Proposed Action have been permitted since 1996, these emissions have been found by the District to be compatible with the State Implementation Plan and Imperial County Air Quality Attainment Plan. The maximum potential health risks are lower than the thresholds set by CAPCOA (1993).

TABLE 4.1.8-13
EMISSION CHANGES
PRODUCTION INCREASE FROM 40 (1) TO 60 MILLION TONS PER YEAR
CONFORMITY DETERMINATION
MESQUITE MINE EXPANSION

SOURCE	EMISSION RATE (tons/year)				
	NO_x	ROC	PM_{10}	SO_x	CO
Proposed Stationary and Mobile (Onsite)	820	51	55	86	353
Proposed Fugitive PM10 (Onsite)	0	0	389	0	0
Proposed Mobile (Offsite)	16	4	0.3	0.3	83
Total Proposed Project	836	56	444	86	436
Stationary and Mobile (Onsite) @ 40 million tpy	887	21	32	20	156
Fugitive PM10 (Onsite) @ 40 million tpy	0	0	908	0	0
Mobile (offsite) @ 40 million tpy	13	0.7	0.3	0.9	11
Total Mine @ 40 million tpy	900	22	941	21	167
Expansion Project Emission Changes @ 40 to 60 million tpy	-64	34	-496	65	269
Conformity Threshold	100	100	100	(2)	(2)
Is Net Total Emission Change Below Threshold? (3)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
1996 Imperial County Emissions	13,140	8,760	91,250	(2)	(2)
10% of 1996 Imperial County Emissions	1,314	876	9,125	(2)	(2)
Is Net Total Emission Change Less Than 10% of Nonattainment Area Inventory? (4)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

(1) To be conservative in assessing the possible need for a conformity determination, existing emissions are defined as the maximum under the previously permitted mine production rate of 40 million tons per year, which was increased to 60 million tons per years in 1996. That increase in production rate did not require a Federal action.

(2) Neither SO_2 nor CO have a conformity threshold because they are not nonattainment pollutants, nor federally-classified by USEPA as being in maintenance areas, defined as follows: Maintenance area: "…area with a maintenance plan approved under Section 175A of the Act."

(3) Conformity determination by Federal agency not required if net total emission change is less than regulatory threshold.

(4) Requirements of conformity regulations do not need to be fulfilled if net total emission change is less than 10 percent of the nonattainment area inventory.

Consistency With District Rules and Regulations

The NSR requirements of Rule 207 are satisfied because of the following:

- Potential air quality impacts have been analyzed.
- Ground-level concentrations at and beyond the fence line are below California Ambient Air Quality Standards.
- BACT would be satisfied for each stationary or fugitive dust source.
- Emissions will cause no net increase of nonattainment pollutants in excess of 137 lbs/day, hence offsets will not be needed.
- Health risk assessment demonstrates that noncriteria pollutant air emissions would not cause carcinogenic nor noncarcinogenic health risks to exceed significance criteria.
- A permit to operate already exists for each stationary source at the expanded production rate of 60 million tpy.

The Mesquite Mine has operated and would continue to operate its stationary sources of air emissions in compliance with District prohibitory Rules 400, 401, and 403 through 407.

4.1.8.6 Mitigation Measures

Because PM_{10} is a nonattainment pollutant in Imperial County, special attention was given to fugitive dust control measures. Control measures for the Proposed Action would continue to include the following:

- Wet drilling.
- Use of an enclosure and baghouse for loading and unloading of lime.
- Enhanced watering of unpaved roads, and activity areas (e.g., digging and loading overburden/interburden and ore into haul trucks, placing overburden/interburden on storage areas).
- Continuation of a vigorous mobile equipment maintenance program to assure good working condition and avoid excessive emissions.
- Monitoring of 24-hour PM_{10} concentrations at four perimeter stations to assure that no excessive fugitive PM_{10} travels offsite.

The generation of fugitive PM_{10} on unpaved roads would be reduced by at least 80 percent, using chemical dust suppressants, as shown in this analysis, or other techniques with equivalent effect. Chemical dust suppressants do not need to be repeatedly applied to previously disturbed areas and wind erosion areas as long as mobile equipment is prevented from breaking the crust that tends to form on these soils. The formation of crust is considered equivalent to 80 percent control on such areas. Further, the mine has reseeded over 500 acres to reduce dust generation.

4.1.8.7 Level of Significance After Mitigation

With implementation of the PM_{10} dust control measures described in § 4.1.8.6, the Proposed Action would result in no significant impact to air quality.

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4.1.9 Land Use

4.1.9.1 Assumptions and Assessment Guidelines

This land use impact analysis considers the potential effects of the Proposed Action on existing and planned land uses in the vicinity of the mine site. The Proposed Action's effect on surrounding land uses would be significant if the proposed expansion would be incompatible with existing land uses. The Proposed Action's effect on planned land uses would be considered significant if the proposed expansion would not be in conformance with the applicable land use plans and policies described in Section 3.1.9 of this EIR/EIS. Other potential land use compatibility impacts of the proposed expansion include permanent features of the proposed use, such as aesthetics, noise and traffic, that are analyzed in more detail in Chapter 4 in this EIR/EIS.

4.1.9.2 Impacts of the Proposed Action

The following discussion considers the effects of all proposed and optional facilities on the proposed expansion site, and nearby lands. The use of the existing mine would be in conformance with all adopted plans and policies, and with existing land uses, as described in the Noise, Transportation, and Public Health and Safety sections.

Compatibility with Existing and Surrounding Land Uses

Mesquite Mine

The proposed Mesquite Mine expansion is within a designated mine site, except for the two north half sections that were once part of the Chocolate Mountains Aerial Gunnery Range (CMAGR). The previous EIR found that the mine operation (as implemented) would not create land uses incompatible with surrounding uses. Existing mining and recreation uses were found not to be significantly affected by the Mesquite Mine operation. The Proposed Action would result in an expansion and an extension of existing mining activities on the existing site, which would essentially postpone future non-mining use of the mine pit, overburden disposal areas and the heap leach area. The physical characteristics of remaining primary project facilities would permanently alter the area's value for visually-sensitive recreation activities. Reclamation of the site would mitigate the visual impacts of the mine and therefore, its impact on related recreation activities.

Surrounding Community

The nearest land uses surrounding the Proposed Action site include residential and commercial uses at the Boardmanville and Glamis Beach Store areas, the ISDRA, North Algodones Dunes Wilderness Area and ACEC, and large open space areas used for OHV riding, target shooting, hunting, and prospecting. The mine is located at least three miles from these uses. Due to the distances between the mine and these residential, commercial, and recreational uses, the mine expansion would not be an incompatible land use, and impacts would not be significant.

BLM Public Lands

The mine expansion (Proposed Action) would add approximately 93 acres of federal land that is presently outside the permitted mine areas and managed by the BLM to the mine area. For the mine to be expanded to the north of the existing mine as proposed, BLM agreed in 1996 to exchange state school lands, pursuant to the California Desert Protection Act, for BLM owned lands (the two north half sections) located in the CMAGR. The purpose for this exchange is for their likely mineral value and the potential value of future revenues to the State Teachers Retirement Fund.

The Singer Geoglyphs ACEC is located southeast of the proposed mine expansion site. The area was established by the BLM to protect cultural and historical sites, including the Singer Geoglyphs. The geoglyphs would not be affected by the Proposed Action because all of the cultural resources associated with the ACEC are located south of SR 78, outside of the project boundaries. Because the cultural resources associated with the ACEC are not within the proposed CDCA Plan Amendment Area, the Proposed Action would not impact the resources for which the ACEC was established.

Chocolate Mountains Aerial Gunnery Range

The proposed expansion would be compatible with the CMAGR. Existing uses of the CMAGR include military aircraft training and testing.

During a site visit of the mine, U.S. Marine Corps personnel stated that their only concern with the proposed expansion was the issue of lighting and its potential interference with pilot's NVDs (Night Vision Devices) (Personal Communication, Robert Reilly, October 1999). Potential lighting impacts to the CMAGR are discussed in the Visual Resources section of this EIR/EIS (Section 4.1.11).

Compatibility with Adopted Land Use Plans and Policies

The proposed project site and surrounding areas are governed by several adopted land use plans and policies, including the Imperial County General Plan, Imperial County Zoning Regulations, California Desert Protection Act and the BLM CDCA Plan. The proposal action's conformance with adopted plans and policies is evaluated below.

Imperial County General Plan

Land use planning and development in Imperial County is guided by the County's 1993 General Plan. Each element of the General Plan includes specific goals and objectives to be used as guidelines for implementation of development policies in Imperial County. Those elements of the General Plan that address land use goals and objectives applicable to the Mesquite Mine include the Land Use, Noise, Water, Seismic and Public Safety, and the Conservation and Open Space Elements. The Land Use Element has designated the area for "special purpose facility, government/special public, and recreation/open space" (Imperial County, 1993). As part of an originally approved conditional use permit, mining and processing of mineral, aggregate, or other natural resources is permitted. The Open Space Element has identified the project site as Conservation and Open Space for the managed

production of resources. This category allows for extraction of natural resources such as metals, sand and gravel and clay (Imperial County, 1993).

The following section lists the major objectives identified in the County's Land Use, Seismic and Public Safety, and the Conservation and Open Space Elements that apply to the proposed action, and discusses the Proposed Action's conformance with each objective.

Land Use Objectives

Objective 7.1 of the Land Use element states:

"Provide adequate space and land use classifications to meet current and projected economic needs for extractive activities."

The County General Plan designates the area for special purpose facility, government/special public and recreation/open space. The proposed expansion would be consistent with this designation. As part of the 1996 land exchange under Section 707 of the California Desert Protection Act, the Proposed Action would utilize State-owned parcels (the two north half sections) located in the CMAGR for mineral extraction. The Proposed Action is consistent with this objective.

Objective 7.2 of the Land Use element states:

"Require that extractive uses are designed and operated to avoid air and water quality degradation, including groundwater depletion, other adverse environmental impacts, and comply with the State Surface Mining and Reclamation Act and County Surface Mining Ordinance."

The existing mine currently operates under various permits authorized by County of Imperial, the RWQCB, SMARA and other applicable regulations. The Proposed Action will be held to the same standards as the existing mine, and will continue to meet those standards. Therefore, the Proposed Action would be consistent with this goal.

Noise Element

Objective 1.1 of the Noise Use Element states:

"Adopt noise standards which protect sensitive noise receptors from adverse impact."

Applicable industrial noise regulations provide for adequate protection of employees in the working environment. Newmont is responsible for complying with applicable equipment noise standards and providing employee ear protection devices as required by the Mine Safety and Health Administration (MSHA). As described in Section 4.1.7 (noise), due to the lack of any nearby sensitive receptors and distance from populated areas the mine's, the proposed action would not result in a significant adverse impact to sensitive noise receptors.

Seismic and Public Safety Element

Objective 1.1 of the Seismic and Public Safety Element states:

"Ensure that data on geological hazards is incorporated into the land use review process, and future development process."

The Geology/Soils/Mineral Resources section of this EIR/EIS (Section 4.1.1) discusses the potential for geological hazards to affect the Proposed Action. Tectonic activity is primarily associated with fault systems located 26 or more miles from the Mesquite Mine site, and settlement of the underlying conglomerate is not expected to occur. As discussed in Section 4.1.1, with mitigation no significant geological impacts would occur and Proposed Action would be consistent with this objective.

Objective 1.6 of the Seismic and Public Safety Element states:

"Ensure environmental hazards are considered when siting critical facilities."

The Geology/Soils/Mineral Resources and Environmental Health and Public Safety section of this EIR/EIS (Sections 4.1.1 and 4.1.12, respectively) discusses potential environmental hazards associated with siting and operating a mine at the proposed site. Mitigation measures are identified such that impacts would not be significant. Therefore, the Proposed Action would be consistent with this objective.

Objective 1.7 of the Seismic and Public Safety Element states:

"Require developers to provide information related to geologic and seismic hazards when siting a Proposed Action."

See discussion under Objective 1.6.

Objective 1.9 of the Seismic and Public Safety Element states:

"Encourage the reclamation of lands where mining, irrigation, landfills, solid waste, hazardous materials/waste storage or disposal, and natural soil erosion have occurred."

The proposed reclamation plan is included as an appendix to the proposed POO (Newmont, 1999). The Reclamation Plan would be implemented once the mine is closed, to the satisfaction of BLM, County, EPA and other applicable regulatory agencies. Therefore, with mitigation, the Proposed Action would be consistent with this objective.

Conservation and Open Space Element

Objective 2.3 of the Conservation and Open Space Element states:

"Protect unique, rare, and endangered plants and animals and their habitats."

The Proposed Action would include the transfer of category I or II desert tortoise habitat to BLM as compensation for loss of lower quality category II and III desert tortoise habitat. Also, the Applicant shall allow salvage of appropriate desert vegetation (i.e., barrel cactus) prior to ground disturbance. The Proposed Action could result in a net gain (both in quantity and quality) in federally owned and managed habitat for the threatened desert tortoise, and would be consistent with this objective. Compensation lands would be higher quality Category I or II desert tortoise habitat whereas the proposed action would impact lower quality area is Category II or III desert tortoise habitat. For these reasons, the proposed would be consistent with this objective.

Objective 5.1 of the Conservation and Open Space Element states:

"Encourage the sound extraction of mineral and quarry/aggregate resources while protecting the natural desert environment."

See Objective 5.3 of the Conservation and Open Space Element.

Objective 5.3 of the Conservation and Open Space Element states:

"Require that mineral extraction and reclamation operations be performed in a way that is compatible with surrounding land uses and minimize adverse effects on the environment."

The existing mining operation was previously evaluated for potential land use impacts, and has operated for more than 14 years. The operation has been compatible with surrounding land uses, such as clay mining and recreational uses. The existing mining operation is consistent with the CDCA Plan and the Imperial County General Plan, and operates under the permits issued under the Surface Mining and Reclamation Act (SMARA) and other applicable regulations. As described in Section 4.1.9.2, the proposed expansion would not result in significant, unmitigable environmental impacts to surrounding uses or the environment. For these reasons, the proposed expansion would be consistent with this objective.

Objective 5.4 of the Conservation and Open Space Element states:

"Safeguard the use and full development of all mineral deposits."

The proposed expansion would recover known economically developable mineral deposits onsite. It is important to allow for future recovery of marginal mineral resources onsite should the technology become available or the mineral prices increase. Therefore, the Applicant would not backfill pit

mine areas that contain ore that could be economically feasible to process in the future. The Proposed Action would be consistent with this objective.

Objective 5.5 of the Conservation and Open Space Element states:

"Regulate the development adjacent to or near all mineral deposits and geothermal operations due to the potential for land subsidence."

As described in Section 4.1.1 of this EIR/EIS, subsidence is not expected to occur onsite.

Objective 7.1 of the Conservation and Open Space Element states:

"Encourage the preservation and enhancement of the natural beauty of the desert and mountain landscape."

To enhance the visual compatibility of the mine site with the surrounding terrain, the Applicant proposes to regrade certain sharp corners of OISAs and heap leach pads to reduce visual impacts as part of the proposed Reclamation Plan. As discussed in Section 4.1.11, visual impacts of the proposed expansion would not be significant. Additionally, the provision of compensation lands for desert tortoise mitigation would result in the preservation of the compensation lands providing both biological and visual benefits.

Objective 10.1 of the Conservation and Open Space Element states:

"Ensure that all facilities shall comply with current federal and state requirements for attainment of air quality objectives."

The Air Quality Section of this EIR/EIS (Section 4.1.8) addresses current federal and state requirements for attainment of air quality objectives. This section finds that the Proposed Action would be consistent with the Imperial County Air Quality Attainment Plan and would implement one of the measures identified in the SCAQMP. Therefore, the Proposed Action would be consistent with this objective.

Objective 10.2 of the Conservation and Open Space Element states:

"Recognize the regional significance of the development and conservation of recreational opportunities in Imperial County."

The regional significance of the development and conservation of recreational opportunities in Imperial County are recognized and fully addressed in Section 3.1.10 and 4.1.10 of this EIR/EIS. Section 4.1.10 finds that no significant impacts to recreational resources would occur. Therefore, the Proposed Action would be consistent with this objective.

Objective 10.9 of the Conservation and Open Space Element states:

"Conserve desert lands, within the County's jurisdiction for wildlife protection, recreation, and aesthetic purposes."

See the discussion Objectives 2.3 and 7.1of the Conservation and Open Space Element which describes how the project conserves desert lands for wildlife protection and aesthetic purposes.

The affected recreational lands on-site have no unique or important recreational qualities or features compared to the thousands of acres of neighboring public lands designated for recreation. Therefore, impacts to recreational resources would not be significant, and the project would be consistent with this objective.

Zoning

The County has zoned the project site and surrounding area as S-2 (Open Space/Preservation) M-3, and G/S (Government/Special) with the exception of the area containing the 2,290-acre Mesquite Regional Landfill, which received an approved zone change in March 1997 from the "S" (Open Space) to the "M-3" (Heavy Industrial) Zone. The S-2 Zone classification permits multiple use of the area, consistent with the objectives of the Open Space Element of the Imperial County General Plan (Imperial County, 1993). In the event that a parcel zoned G/S by virtue of the fact that it is under public ownership is sold or otherwise privatized, the zone of the parcel shall be automatically changed to that of S-2 (Title 9 Imperial County Land Use Ordinance Division 5, § 90520.12). Surface mining operations may be permitted in any zone upon the granting of a conditional use permit (ICLUO § 83422). Subsequent approvals relevant to the Proposed Action are listed in Chapter 1, § 1.2.4 (Previous Mine Permits). The proposed expansion is a permitted use under existing zoning and would be consistent with ICLUO. Impacts would not be significant.

California Desert Protection Act

The Proposed Action would result in the extension of the existing Big Chief Open Pit Mine and the construction of a surface-water diversion channel, extending into the two north half sections of the project area. These lands are part of an approved Memorandum of Agreement (MOA) with the BLM to exchange state school lands pursuant to the California Desert Protection Act for BLM owned lands (the two north half sections of the project area) located in the CMAGR. The MOA facilitates a land exchange, which involves the transfer of the two north half sections to the State Lands Commission in exchange for an equal value of SLC's inholdings within the confines of the CDPA boundaries. A mineral assessment would be done in accordance with a previously SLC approved MOA between Department of Interior and the SLC regarding treatment of mineral potential in land exchanges. The purpose of the land exchange is to partially fulfill the requirements of Section 707 of the Desert Protection Act of October 31, 1994, which states that the Secretary of Interior give priority to "lands with mineral interests, including geothermal, which have the potential for commercial development but which are not currently under mineral lease or producing Federal revenues" (Section (b)(2) and (b)(2)(B)).

BLM California Desert Conservation Area Plan

CDCA has designated the Mesquite Mine area as Multiple-Use Class M. This designation provides for balanced use between higher-intensity uses and protection of public lands. This designation allows mining, livestock grazing, energy and utility development, and recreational uses. Management of Class M lands is designed to conserve desert resources and mitigate any damage to those lands caused by permitted uses (BLM, 1980). Its purpose is to provide for concentrated use of lands and resources to meet human needs. The proposed expansion would be consistent with CDCA and class M land designationand impacts would not be significant.

4.1.9.3 Mitigation Measures

As land use impacts from the Proposed Action would not be significant, no mitigation measures are required.

4.1.9.4 Level of Significance After Mitigation

No mitigation would be required, and land use impacts would not be significant.

4.1.10 Recreational Resources

4.1.10.1 Assumptions and Assessment Guidelines

The following impact analysis considers the effects of the Proposed Action on recreational resources in the vicinity of the Mesquite Mine. For this analysis, recreational resource impacts would be considered significant if the Proposed Action would substantially degrade or reduce the quality or quantity of the area available for existing or future recreational opportunities. An unmitigated loss of a unique recreational resource would be a significant impact. Non-conformance with the Wilderness Act of 1964, the California Desert Protection Act (CDPA) or the BLM Interim Management Policy would be a significant impact.

4.1.10.2 Impacts of the Proposed Action

Mesquite Mine Site

The Proposed Action would result in the extension of the existing Big Chief Open Pit Mine and the construction of a surface-water diversion channel, extending into the two north half sections of the project area. These lands are part of an approved Memorandum of Agreement (MOA) with the BLM to exchange state school lands pursuant to the California Desert Protection Act for BLM owned lands (the two north half sections of the project area) located in the Chocolate Mountain Gunnery Range. The MOA facilitates a land exchange, which involves the transfer of the two north half sections to the State Lands Commission in exchange for an equal value of SLC's inholdings within the confines of the CDPA boundaries. A mineral assessment will be done in accordance with a previously SLC approved MOA between Department of Interior and the SLC regarding treatment of mineral potential in land exchanges. The purpose of the land exchange is to partially fulfill the requirements of Section 707 of the Desert Protection Act of October 31, 1994, which states that the Secretary of Interior give priority to "lands with mineral interests, including geothermal, which have the potential for commercial development but which are not currently under mineral lease or producing Federal revenues" (Section (b)(2) and (b)(2)(B)).

The area surrounding the Mesquite Mine is used by approximately 4,000 visitors a year. However, the majority of recreational users counted in this survey used lands located closer to Glamis than to the proposed site.

There are approximately 280,000 acres of BLM Class M and Class I desert lands available for recreation in the CDCA in Imperial County. The Proposed Action would not result in any disturbance of federally-owned land that has not already been committed to mining, and the northern expansion would not result in any loss of BLM Class M nor Class I land available for recreation. Because there would be no loss to designated or planned recreational lands, the Proposed Action would not significantly impact existing or future recreational opportunities.

The Mesquite Mine Overlook Trail was a voluntary project undertaken by the Mine and the BLM. The joint BLM/Gold Fields agreement that created this unique recreational resource allows either

party to "walk away" from the agreement with 30-days notice. The self-guided trail would not be affected by the proposed Mine expansion.

The Proposed Action would introduce additional overburden piles within the Mine site, as described in Section 4.1.11, Visual Resources. The Mesquite Mine Overlook Trail is the only recreational resource provided on-site. This trail is provided specifically for viewing the Mine and related operations. Visual impacts to the Overlook Trail would not be significant because the trail would continue to provide views of the mine.

The mine and associated facilities are located a sufficient distance from the ISDRA that it would not significantly impact recreational uses at the sand dunes. The Mesquite Mine is far enough away that on-site noises would not be heard in the ISDRA or the more heavily used camping areas. Impacts associated with project-related traffic noise on SR 78 would also not be significant.

Wilderness Areas

The wilderness areas identified in Section 3.1.10 are located far enough away from the mine that impacts would not be significant.

4.1.10.3 Mitigation Measures

The Applicant shall implement the mitigation measures described in the Transportation (4.1.6), Noise (4.1.7), and Environmental Health and Public Safety (4.1.12) sections of this EIR/EIS to mitigate impacts to recreational resources.

Mesquite Mine Site

Incorporated by Regulation

There would be no additional mitigation measures required by regulation to mitigate recreational resource impacts besides those described in Sections 4.1.6, 4.1.7, 4.1.8, and 4.1.12.

Incorporated by Project Design

Although the project area does not have a high rating for scenic recreation, reclamation of the site and implementation of visual mitigation measures would partially mitigate the visual intrusion of the project and therefore, its impact on related recreation activities. Mitigation measures incorporated by project design are described in Sections 4.1.6, 4.1.7, 4.1.8, and 4.1.12.

Incorporated to Avoid Potentially Significant Impacts

The above mitigation measures would fully mitigate impacts associated with on-site activities by the Proposed Action to recreational resources. Therefore, additional mitigation would not be required.

4.1.10.4 Level of Significance After Mitigation

Proposed Action impacts to recreational resources would be fully mitigated by the measures described above. With mitigation, impacts would not be significant.

4.1.11 Visual Resources

4.1.11.1 Assumptions and Assessment Guidelines

In order to assess the potential visual impacts of the Proposed Action, existing views of the mine site were photographed from selected viewpoints along SR 78, the closest public roadway from the proposed expansion site. Two of these viewpoints were chosen to represent existing conditions. A reference map providing the location and reference number for both of the viewpoints is shown in Figure 3.11-1. Photo simulations were made representing views to the mine site at completion of the Proposed Action but prior to reclamation. These were then used to assess impacts to existing conditions. The photo-simulations were prepared by BRG Consulting, Inc., using a Computer-Aided Drafting and Design (CADD) system. Information on existing site topography and project development plans was digitized by computer to obtain accurate physical configurations and elevations.

Post-mining, pre-final reclamation views of the mine site are presented in Figure 4.1.11-1 (View Point #1) and in Figure 4.1.11-2 (View Point #2). Both of these views would differ from the post-final reclamation views principally by the more "stepped" slopes and flat tops of the waste rock stockpiles and the heap, and the reduced level of revegetation. These photo simulations have not been used in the analysis of the long-term impacts of the Proposed Action since they show the visual effects at an interim stage and not following the completion of mine reclamation. This is consistent with BLM Visual Manual Section 8400. Long-term impacts will be less than indicated in Figures 4.1.11-1 and 4.1.11-2.

The BLM Visual Resource Management (VRM) System Guidelines (BLM 1986 and 1986) provide a system of analysis to determine the potential visual impacts that would occur with project implementation. The BLM Visual Contrast Rating system is used in this analysis to assess the potential visual impacts of the Proposed Action. The project site is located in a Multiple-Use Class M (Moderate Use) designated area within the CDCA. The objectives of Multiple-Use Class M, based on a controlled balance between higher intensity use and protection of public lands, can be paralleled with VRM Class III as described by the BLM VRM System Guidelines. VRM Class III allows for moderate levels of change to the characteristic landscape. The BLM provides guidelines and worksheets for the VRM system (see VRM, Appendix G). For the purposes of this analysis, a significant impact is defined as project-related change that would be considered substantial in a VRM Class III area as follows:

- A strong degree of contrast (i.e., where the project-related element contrast demands attention, would not be overlooked, and is dominant in the landscape).

- Light and glare conditions that would adversely and substantially affect a sensitive receptor.

4.1.11.2 Impacts of the Proposed Action

The visual effects of an open-pit, heap-leach mine with out-of-pit overburden storage at the Mesquite Mine have been addressed in the following previous environmental documents:

1. *Final Environmental Impact Report/ Environmental Assessment for the Mesquite Project, Imperial County, California* (SCH No. 84040408); prepared for and under the supervision of the BLM and the County of Imperial by The Butler Roach Group, Inc. (now BRG Consulting, Inc.) and St. Clair Research Systems, Inc. dated December 12, 1984.
2. *Final Environmental Impact Report/Environmental Assessment, EA No. CA-067-87-48, for the VCR Mining Project, Imperial County, California* (SCH No. 87052709); prepared for and under the supervision of the BLM and County of Imperial by Environmental Solutions, Inc., dated October 28, 1987.

The visual analyses described in these documents were considered in determining the impacts of the Proposed Action and alternatives.

Visibility

The project site could potentially be viewed from far away, such as from within the Imperial Valley by an observer specifically searching for the proposed landform. The significance of these views would be increasingly diminished at such distances because the expanded OISAs would barely be distinguishable from topography resulting from the existing permitted mining operations.

In general, the most obvious visual features of the proposed mine expansion would be the landform alterations. The contoured hill-like form would result in vertical features extending above the horizon line in a view that is generally dominated by horizontally-oriented linear features. The existing flat-topped overburden piles currently extend to heights of approximately 280 feet above existing grade. The resultant form would be that of a large, contoured hill somewhat similar in texture but lighter in color than natural topographic features in the project vicinity (e.g., Brownie Hill).

The visual analysis for this EIR/EIS considers viewers in an area around the site that is bounded to the north by the Chocolate Mountains; bounded to the south by the intersection of Ted Kipf Road and Ogilby Road; bounded to the west by the sand dunes; and bounded to the east by Ogilby Road. Views from farther distances would hardly be changed with implementation of the Proposed Action. For westbound travelers, visibility of the project would begin as far east as the intersection of SR 78 and Ogilby Road. However, unobstructed views to the project site would not occur until westbound travelers are within approximately three miles of the project. Westbound travelers would have potential views of the project site until past the western boundary of the site. For eastbound traffic, visibility would begin at the Osborne Overlook and would continue until passing the eastern boundary of the Proposed Action site.

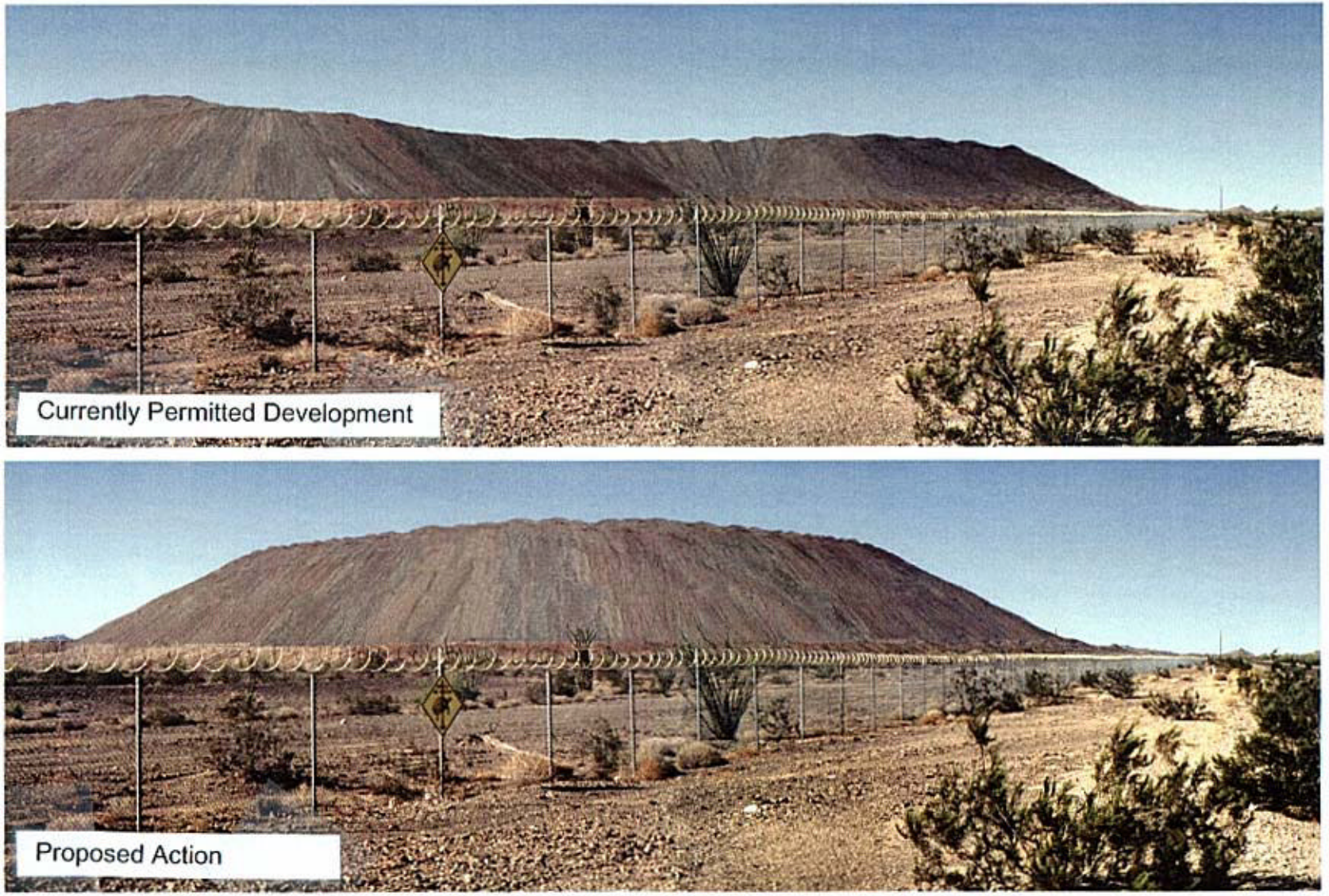
SOURCE: BRG Consulting, Inc., 2000.

No Scale

Mesquite Mine Expansion EIR/EIS

Visual Simulations of Currently Permitted Development and Proposed Action, View Point No. 1

FIGURE 4.1.11-1



SOURCE: BRG Consulting, Inc., 2000.

No Scale

Mesquite Mine Expansion EIR/EIS

Visual Simulations of Currently Permitted Development and Proposed Action, View Point No. 2

FIGURE

4.1.11-2

From SR 78, expansion of the overburden and heap-leach piles would be the most prominent topographic change, and would likely impose the most significant effect in both distant and near views of the site. The East Rainbow South OISA would extend approximately eight-tenths of a mile along SR 78, and would be the most visible, in terms of size and as a result of its location immediately adjacent to the west side of the highway right-of-way. This feature would be visible from the north, east, and south.

During the operational phase, facilities and equipment associated with mining operations (e.g., front-end loaders, graders, bulldozers, water trucks, and haul trucks) would also be visible from SR 78. The increase in activity and movement associated with these facilities/equipment would be similar in contrast to existing activities at the site (mining operations and would not strongly contrast with the existing setting.

The proposed diversion channels would be engineered to convey the designed storm events. Views of the diversion channels in the area east of the proposed East Rainbow Extension may also be limited by berms adjacent to the drainage channels. See Figure 2.1-2. Where possible, the channel configuration would be constructed with natural appearing curves, benches, and banks. Surfaces of the banks and benches would then be revegetated to resemble the microphyll woodlands in adjacent washes. The benches would be regraded into microcatchment basins and sown with a seed mix gathered in nearby washes. In addition, small trees, cacti and some shrubs would be transplanted from washes into the expansion areas.

The following discussions assess visual impacts of the proposed expansions at each of the two viewpoints identified in Section 3.1.11. The key visual issue is the degree of visual change anticipated between the existing environment and the views of the Proposed Action.

Viewpoint No.1

The existing middleground and background views from this vantage point include a series of contrasting flat-topped, mine-related heap leach piles and OISAs. The result would be a more gently sloped hillside behind the remaining overburden piles and a small, natural dark-colored hill remaining in middleground views. At this distance (approximately three miles), existing vegetation and landscaping would have little screening effect.

From Viewpoint No. 1, both permitted development and the Proposed Action expansion of heap leach piles would be highly visible, and would markedly contrast with the natural desert landscape. Previous environmental review of the Mine (Environmental Solutions, Inc., 1987) found that the approved heap leach pads and OISAs would not significantly affect visual resources. The overall contrast of the Proposed Action to the Mine development that is already permitted would be incremental (See Figure 4.1.11-1). Therefore, the previous analyses of the visual impacts of the Mesquite Mine applies to the Proposed Action. Consistent with this previous analysis, impacts would not be significant.

Viewpoint No.2

Figure 3.11-2 shows that existing views from the highway into the East Rainbow Pit are extremely limited. Persons in the public right-of-way would be able to see into the mine pit, but would be not able to see across the pit with a view of the upper edge of the north pit wall. In particular, the visual analysis indicates that drivers on SR 78 would not have views into the pit. Such views would be blocked even further by landforms approved under existing Mine permits (Figure 4.1.11-2). Consequently, in terms of public views, the mine pit itself is not considered a significant visual element of the Proposed Action.

The proposed East Rainbow Drainage Diversion Channel would be visible in the immediate foreground, but in the closest possible views, natural-appearing curves, benches, and banks would mitigate its visual impact.

As seen in Figure 4.1.11-2, the proposed East Rainbow South OISA expansion would be highly visible from Viewpoint No. 2. From this close-range vantage point, the OISA would be seen as a more prominent landform relative to the expansive landscape that forms its setting. However, as seen in the upper simulation on this page, Mine development that is already permitted would dominate views from this and other close viewpoints. The permitted OISAs would be highly visible, and would produce a high contrast against the natural desert landscape. As discussed above, the overall contrast of the Proposed Action to the mine development that has already been permitted would be incremental (Figure 4.1.11-2). Therefore, the previous analyses of visual impacts of the Mesquite Mine applies to the Proposed Action. Consistent with the previous analyses, visual impacts would not be significant.

Light and Glare

Night lighting would be provided at the mine to facilitate up to 24-hour operations. The use of night lighting is a concern because of the potential for fugitive illumination to interfere with the visibility of drivers on SR 78, to interfere with Night Vision Devices (NVDs) used during nighttime flight operations at the CMAGR, and to interfere with the recreational experience of users of the ISDRA.

Night lighting is currently being used at the Mesquite Mine, and would continue to be part of the existing environment until the mine is closed, which is anticipated to occur in six years, or longer depending on economics. Lighting levels for the mine would be as required by OSHA, to ensure safe and proper working conditions. All lighting would be directed downward and shielded to minimize fugitive illumination. The use of cut-off fixtures would result in no direct lamp glare in the direction of the highway. Therefore, potential impacts to motorists along SR 78 associated with night lighting at the mine would be below a level of significance.

The area west of the Proposed Action site is heavily used for camping. The area located south of SR 78 and in the vicinity of Glamis is most heavily used. No substantial changes would be made to night lighting at the mine. Thus, the Proposed Action would not be substantially more visible to campers than the existing Mesquite Mine.

Night Vision Devices currently used during U.S. Marine Corps nighttime operational flights at the CMAGR, would potentially be affected by nighttime lighting at the mine site. These devices allow the military to see at night using light at levels much lower than are detectable by the unaided human eye. Nighttime lights which seem normal to the average individual would appear extremely bright through these devices. For safety reasons, the U.S. Marine Corps generally directs its pilots to avoid the Mesquite Mine area when using NVDs. However, some aircraft may still operate in the area from time to time with NVDs. The Mesquite Mine has worked with the Marine Corps to ensure that mine lighting does not pose a hazard to these pilots. Since it began operation in 1984, the Mesquite Mine has had a constructive working relationship with the Marine Corps regarding these issues.

Site Reclamation

Newmont has developed conceptual reclamation configurations for the OISAs that include minor regrading. The configurations have been developed to provide a more aesthetically pleasing landscape, creating a terrain that is conducive to the native surrounding area. The conceptual approach for typical minor regrading of these areas is shown on Plan of Operations (POO, 1999) Figure B.9 (Appendix B).

The present storage areas that are complete and proposed OISAs would have surfaces of mixed rock substrates and course alluvium with little developed soil. The OISAs have two types of upper flat surfaces 1) loose, end-dumped material with hummocky surfaces that result from dumping material without dozing or grading, and 2) hard-packed surfaces as a result of haul truck traffic and dozing. Initial grading in these areas would rip those areas that are hard-packed and form microcatchment basins. Side slopes would be left at an angle of repose. Top surfaces of end-dumped overburden/interburden would be contour-graded into undulating landforms that blend in with the surrounding terrain (see 1999 POO Drawings B.11 and B.12). All surfaces except the faces of the slopes would be broadcast seeded immediately after grading.

Microcatchment areas, shown on 1999 POO Drawings B-8A, B-8B and B-8C, would also be developed on the surfaces of the OISAs. These would enhance water retention, aiding vegetative growth on surfaces of the OISAs, and helping to re-establish a self-supporting and diverse ecosystem. Regrading would also be performed in potential erosion prone areas, to provide additional erosional stability for the reclaimed configuration. Long-term visual impacts from the OISAs and heap leach would be reduced by the proposed reclamation activities. Long-term visual impacts would be in conformance with the VRM Class III Guidelines and would be insignificant.

4.1.11.3 Mitigation Measures

Measures Incorporated by Regulation

There would be no mitigation measures required by regulation.

Measures Incorporated by Project Design

Following completion of Project mining activities, all buildings, equipment, supplies, and debris shall be removed to improve the visual appearance of the Project area.

The applicant shall ensure that project-related lighting is pointed toward the ground and not at sensitive receptors such as drivers on SR 78 and concentrations of campers in the Glamis and Boardmanville areas.

The Applicant shall minimize the presence of reflective material on-site at night that could reflect downward pointed light up or toward sensitive receptors.

The Applicant shall construct the proposed mine expansion so that it resembles a natural landform to the extent practicable. Measures to be incorporated include contouring the tops and sides of the OISAs.

In conformance with the Reclamation Plan as approved by the BLM and Imperial County, all disturbed areas shall be recontoured and reseeded or revegetated with native or indigenous species complementary to vegetation found in the surrounding area.

Mitigation Measures Proposed to Avoid Potentially Significant Impacts

The potentially significant impact of night lighting on NVDs shall be mitigated by directing all new light sources downward. This would preclude light sources that are directed toward military aircraft operating over the Chocolate Mountains.

4.1.11.4 Level of Significance After Mitigation

The potential for impacts to NVDs would not be significant with incorporation of the proposed mitigation.

4.1.12 Potential Environmental Health and Safety Impacts

4.1.12.1 Assumptions and Assessment Guidelines

This section evaluates the potential public health and safety impacts that could be associated with the proposed expansion of the Mesquite Mine (Mine) as described in the Proposed Action. The primary health concern expressed during public scoping meetings was related to management of chemicals that are used during project operations. Specifically requested was a description of controls that will be utilized for mitigating potential off-site exposure. The following discusses this and other health and safety concerns identified at public scoping meetings, which have the potential to impact health and safety of the operational area of the Mine and surrounding environment.

A potential impact is considered significant if it would create a substantial increase in risk to public health or safety. Potential impacts to ground water, transportation and other elements of the human environment are considered in other sections of the EIR/EIS. Reference to those analyses are made, where appropriate, when they also involve issues associated with public health and safety.

4.1.12.2 Impacts Of The Proposed Action

Mining Activities

The process of mining raw ore material involves activities that could generate potential health and safety impacts to the public and Mine employees. Blasting and the use of heavy construction equipment are typical procedures that are utilized during Mine operations. These methods have been utilized by Mine staff since the beginning of mining activities in 1984.

Explosives would be used during mining operations to break and loosen overburden and ore in the mine pits. The overburden and ore is then loaded onto trucks for transport to overburden stockpiles or leach pads, as appropriate.

Potential health and safety impacts to the public and Mine employees resulting from close proximity to blasting activities and heavy construction equipment. Blasting events will occur during daytime hours on a daily basis or as ore production rates mandate.

Given the remote location of the Mine, potential for significant health and safety impacts to the public resulting from mining operations is not expected. The closest residence to the Mine is approximately one mile away. Noise from blasting activities would be the only potential impact to the area surrounding the Mine. Further discussion of noise impacts is provided in Section 4.1.7 of this EIR/EIS.

Measures for mitigating potential health and safety impacts to Mine employees resulting from operational activities were established at the beginning of Mine operations in 1984. Procedures for handling and discharge of explosives are delineated by the Mine Safety and Health Administration (MSHA) and the Newmont safety manual. Explosives are stored in a secured powder magazine constructed and maintained in accordance with Federal and local permit requirements.

Guidelines for operating heavy construction equipment involved in transportation of overburden and ore to storage and agglomeration facilities are set forth in the Newmont safety manual. No significant potential health and safety impacts to Mine employees resulting from mining operations are expected.

Processing Activities

Heap Leaching

The process of heap leaching removes gold from ore. This system consists of heap leach pads, where ore is leached, and solution ponds where the dilute sodium cyanide solution is contained. The heap leach facilities are constructed over an impervious liner, to prevent contamination of ground water. These liners are designed to meet requirements of the Regional Water Quality Control Board (RWQCB), which establishes specific standards on liner permeability. The sodium cyanide solution application system is contained within closed pipes to prevent potential release of the solution. Solution containment ponds are designed to accommodate additional run-off from the heap leach pads and direct precipitation that could result from large rainstorm events.

Application of the dilute sodium cyanide solution is accomplished through drip irrigation. This method of application reduces the potential for airborne introduction of the solution to the surrounding environment. Drip irrigation also reduces the potential for evaporation of the solution once applied to the heap.

The barren solution percolates through the ore, dissolves gold to create a pregnant solution and collects on the impermeable pad at the bottom of the leach pile. The pregnant solution then flows by gravity into collection channels to solution collection ponds. The solution ponds collect the pregnant solution for transfer to the gold recovery plant. After leaching is complete, the heap is rinsed with fresh water to reduce the residual cyanide content to the level stipulated by RWQCB permits.

Approximately 30 acres of the Vista Heap Leach Pad must be rehandled and moved to allow for the southeast extension of Big Chief Pit. These extensions would excavate previously disturbed lands through which the existing stormwater drainage channel passes in the northeast corner of Section 8, T13S, R19E.

Approximately 6,000,000 tons of spent leach ore is currently under the final phase of leaching on the Vista Pad. Following completion of rinsing, formal closure and State of California approvals, the

rinsed ore would either be removed and backfilled into the existing pits, or would be relocated to a lined heap leach facility (Heap Leach Pad 6). The truncated northern limit of the Vista Heap Leach facility would then be rebuilt to provide a containment berm and solution channel similar to the existing facility.

Potential health and safety impacts to the public and Mine employees resulting from the heap leach process exist through exposure to the dilute sodium cyanide solution. Cyanide has been used in various processing methods to extract gold from ore for over 100 years. The technology of using a dilute sodium cyanide solution to heap leach gold from relatively low grades of ore was initially developed in the early 1970s. Commercial applications of the technology started in the late 1970s and have grown rapidly because it is the only economically feasible method to recover gold from disseminated ore bodies where the gold exists at low concentrations.

Consequently, health and safety impacts to the public and Mine employees resulting from the heap leach process are not expected. Although Mine employees work in close proximity to the process solutions, there are no known cases of accident or severe illness directly due to sodium cyanide solution exposure. Guidelines and handling procedures for application and management of the leaching solution are provided in the Newmont safety manual. Federal and state regulations for use of cyanide solution in leaching processes are also enforced by MSHA and RWQCB.

Impervious liners under the heap leach pads, pregnant solution conveyance channels and associated facility components minimize the potential for exposure of the sodium cyanide solution to surface soils. The chosen solution application method will significantly reduce potential for airborne distribution of the sodium cyanide solution. In addition to the facilities engineered for containment, protection of water quality is also provided by the reactivity of cyanide, which results in its volatilization into the atmosphere, its natural degradation to nontoxic carbon and nitrogen compounds and its fixation with the trace metals in the environment to form less toxic complexes over time.

Gold Recovery Process

Pregnant solution is transferred from the solution collection ponds of the heap leaching facilities to the gold recovery facilities. A carbon adsorption process is performed to retrieve gold from the pregnant sodium cyanide solution. Gold is desorbed from the carbon using stripping solution and then pumped to electrowinning cells for formation of the final material that undergoes benefaction.

Solution used in the heap leaching process (i.e., pregnant solution) and gold recovery process (i.e., stripping solution) are recirculated or recycled through their respective processes. Recirculation promotes additional gold recovery and efficient use of the solutions.

As with the heap leach facilities, the gold recovery facilities are constructed over an impervious liner. Liner specifications and design components meet RWQCB requirements for containment of the reagents used for gold recovery. Additional containment features such as dikes and curbs are currently in place to prevent spills from migrating away from the gold recovery area.

Expansion of the gold recovery facilities is not proposed at this time. The current facilities are capable of additional gold recovery functions resulting from the proposed Mine expansion.

Potential health and safety impacts to the public and Mine employees exist through exposure to reagents used in the gold recovery process (i.e., sodium cyanide solution and carbon stripping solutions). As with the processes used in heap leaching, those utilized for the gold recovery process are well established in gold extraction operations. The Mine incorporated these methods as part of daily operational activities at the beginning of operations in 1984.

Potential health and safety impacts to the public and Mine employees as a result of exposure to reagents used in the gold recovery process are not expected. Additions to existing facilities are not proposed as part of the Mine expansion. Design features of the gold recovery facilities and process previously discussed provide mitigation of potential release or exposure. Both the Newmont Consolidated Plan of Operations and safety manual provide internal guidelines and regulations for proper execution of gold recovery. Specific step-by-step instructions for controlling spills are also given in these documents.

Domestic And Industrial Waste

Domestic and industrial wastes generated during Mine operations are disposed in accordance with County and State of California regulations. Domestic and industrial wastes generated by Mine operations include the following:

- paper
- plastic
- food waste
- glass
- metals
- wood
- motor oil
- hydraulic oil
- solvents
- reagents

Potential health and safety impacts to the public and Mine employees could result from improper disposal, handling and management of domestic and industrial wastes listed above.

Impacts to the public and Mine employees resulting from generation of domestic and industrial wastes are not expected. Regulations and guidelines for proper disposal, handling and management of domestic and industrial wastes are set forth by County and State agencies. The Newmont Consolidated Plan of Operations provides internal procedures for generation of domestic and industrial wastes. These regulations and guidelines have been observed by the Mine since operations began in 1984.

Transport Of Chemical Reagents And Explosives

Mining and gold recovery operations at the Mine require the use of select chemical reagents, explosives and fuels. These materials will be stored on site in appropriate facilities. Explosives and chemical reagents require specific storage enclosures and conditions as mandated by OSHA, Cal-OSHA, MSHA and the Newmont Consolidated Plan of Operations and safety manual.

Reagents are used in ore processing activities to recover gold. Reagents are securely stored on site with adequate protection to prevent and contain any accidental spills. Sodium cyanide is the primary reagent used in the leaching process to remove gold from ore mined out of the proposed expanded pits. Lime is added to the ore as it is placed on the leach pad to maintain necessary pH levels in the leach solution (between 10 and 11) to prevent the formation of cyanide gas. A supply of calcium hypochlorite will be maintained on site for detoxification of any accidental cyanide spills. Calcium hypochlorite will be transported to the Mine by road tanker, kept in storage tanks and metered out as needed. Caustic soda is used as needed in the desorption process. Antiscalants are to be used in system facilities to prevent plugging of solution outlets.

The following three general types of explosives are to be used during blasting activities:

- Reagents
- Class A dynamite boosters
- Ammonium nitrate-fuel oil mixture (ANFO)
- Water resistant slurries

Explosives and detonators are stored in two secure magazines on-site. No change in magazine location on procedures would result from the Proposed Action. As previously mentioned explosives storage facilities are constructed according to guidelines provided by OSHA, Cal-OSHA and MSHA.

Potential health and safety impacts to the public and Mine employees could result from improper storage and transportation of the previously mentioned materials.

Impacts to the public and Mine employees resulting from the transportation and storage of chemical reagents and explosives are not expected. Licensed contractors will transport the previously discussed materials to the Mine. Federal and State guidelines for highway transportation of these goods will be observed. Upon reaching the Mine all chemical reagents and explosives will be stored according to OSHA, Cal-OSHA and MSHA guidelines. As an additional safety management measure, emergency response agencies (i.e., fire department and police department) will be provided with a list of materials being transported to the Mine and the routes used by the licensed contractors.

Security and Safety

Security and safety measures would be employed to minimize the risks of accidental or injury to unauthorized or untrained persons. These measures would include:

- Fencing at facilities where activities could endanger employee or public safety, including the mine pits, heap leach pads, solutions ponds and gold recovery facilities.

- Earthen berms at locations to restrict access to mine pits and haul roads by unauthorized vehicles.

- Personnel trained in security on site 24 hours each day.

Newmont provides site security and safety guidelines in its safety manual. Please see this document for a complete description of the guidelines established to mitigate site security and safety impacts.

With continuation of existing security and safety procedures, impacts to the public due to potentially dangerous mining activities are not expected.

Mine Traffic

Mine operations require the use of various pieces of heavy construction equipment. Transportation of ore from the open pit mines to the heap leach gold recovery areas requires the use of haul trucks and other vehicles necessary for operation of the Mine. Haul trucks are capable of transporting 150 tons of mined ore per load and require more operational space than most Mine vehicles.

Potential health and safety impacts to Mine employees and even members of the public who may be present immediately outside the mine fence could result from improper operation of heavy construction equipment. The presence of unauthorized persons within close proximity to operating heavy construction equipment could result in heath and safety impacts to those individuals.

Potential heath and safety impacts to the public and Mine employees resulting from on site traffic are not expected. Vehicular traffic generated during mining, heap leach and gold recovery activities is retained within the boundary of the Mine. Mine employees required to operate vehicles on site are trained in correct operating procedures. The Newmont safety manual provides specific vehicle operating procedures.

Mine Reclamation

Reclamation would occur for decommissioned facilities during ongoing Mine operation, and for remaining facilities following project completion. Safety measures such as restricting access to pit mines, heap leach pad neutralizing and decommissioning, and storage pond neutralizing would be accomplished. Closure will result in the removal of surface structures associated with ancillary facilities. Some access roads may remain following mine closure to provide access for monitoring and for continuing access to Newmont private lands. As discussed in Sec. 2.1.7, the mine area cannot be returned to its original contours. Limited regrading and surface scarification will be used to create and enhance a self-supporting desert ecosystem. Post closure monitoring will assess surface and ground water for closure of heap leach pads, and determine erosion control and revegetation success for reclamation.

Potential health and safety impacts to the public and Mine employees could result from reclamation activities. Improper or inadequate closure and reclamation of the mining, heap leach and gold recovery facilities could result in such impacts.

Potential health and safety impacts to the public and Mine employees resulting from Proposed Action reclamation activities are not expected. Newmont has created a detailed, encompassing site Closure Plan for the Mine. The Closure Plan has been prepared to satisfy requirements of Section 2574, Article 7 of the CCR (Shepherd-Miller, Inc., 1998). A complete Closure Plan can be found in

the Consolidated Plan of Operations. As previously mentioned, the Closure Plan addresses reclamation of the various operational aspects of Mine operations. Concurrent reclamation of the Mine began in 1998 and will continue until closure. Reclamation activities concentrate on those areas that are no longer active.

4.1.12.3 Mitigation Measures

Incorporated by Regulation

The Applicant shall incorporate environmental health and public safety protection measures required by local, State, or federal regulations into the proposed mine expansion, design and operation, specifically, appropriate OSHA and Cal OSHA worker environmental health and public safety regulations and the continuance of established public safety measures and programs existing at the Mine.

Incorporated to Avoid Significant Impacts

Since environmental health and safety impacts will not be significant and will not change from existing conditions at the Mesquite Mine, no mitigation measures to avoid significant impacts are required.

4.1.12.4 Level of Significance After Mitigation

Based upon regulatory requirements and safe operating practices employed at the Mesquite Mine since 1984, no significant impact for health and safety would occur from the Proposed Action.

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4.1.13 Socioeconomics

4.1.13.1 Assumptions and Assessment Guidelines

Socioeconomic impacts derive primarily from changes in the existing makeup of a community. Changes in the age, ethnicity, or income distribution of an area may affect the community either negatively or positively. For the purposes of this EIR/EIS, an adverse significant socioeconomic impact is defined as follows:

- A substantial decrease in employment within the County.
- A substantial decrease in the wage and salary earnings in the County.
- A substantial decrease in the average wage and salary earnings per job in the County.

The following assumptions have been used in completing this socioeconomic analysis:

- It has been demonstrated at the Mesquite Mine that Imperial County workers can provide a reliable workforce for projects in this area.
- No inmigration of new workers is expected.

4.1.13.2 Impacts of the Proposed Action

Employment and Income

The Proposed Action involves developing additional reserves to support ongoing mining operations. The Mesquite Mine would not be modified with the exception of the expansion and extension of mining operations. The project may require an additional 20 to 30 permanent employees. However, no significant increase in the local population is anticipated and no additional demand for housing or associated facilities would occur because the new workers would most likely be drawn from Imperial County's labor pool. Average wages at the mine would not be expected to change substantially; the hiring of 20 to 30 new workers would increase total wages between $0.9 million and $1.35 million per year for a period of six years. Additional employment and income opportunities would be generated by the new reclamation requirements for the proposed mine expansion areas.

Impacts to employment and income would be beneficial.

Government Revenues

Government revenues would be expected to increase from sources such as local sales and property taxes, and from royalties to be paid by the mine. Precious metals mined from the Big Chief Pit Expansion into the northern half sections owned by State Lands Commission (SLC) would generate

royalties in accordance with State Law and the MOU between BLM and SLC regarding the exchange of these lands for BLM-managed lands under the 1994 CDPA. The total amount of government revenues generated would be dependent on the value of the recovered precious metals.

Government agencies would not incur additional obligations from approval of the proposed mine expansion for the following reasons:

- The Applicant is required to provide bonding for closure, post-closure, and reclamation activities.
- The bond will not be released until such time as the success criteria of the reclamation plan have been met.
- The Applicant is required to pay for mandated environmental monitoring activities.
- There is no need for new or expanded government services from the Proposed Action.

Impacts to government revenues would be beneficial.

4.1.13.3 Mitigation Measures

Mitigation Measures Incorporated by Regulation

The Applicant shall, as required by Title 23, CCR, Section 2574(f), prepare an initial estimate of the closure and post-closure maintenance and corrective action costs. A financial surety that is acceptable to the RWQCB shall then be established and maintained.

The Applicant shall pay for all required environmental monitoring activities as provided by law.

No post-closure maintenance or other corrective actions are anticipated to be needed. The closure bond estimate has been prepared, and is incorporated into the Reclamation Plan portion of the POO. The bond will be established prior to disturbance of proposed expansion areas. <Newmont> {response to EPA 4/6/00 #6a, 6b}

Mitigation Measures Incorporated by Design

No design mitigation measures are required.

4.1.13.4 Level of Significance After Mitigation

Implementation of the Proposed Action would result in no significant adverse socioeconomic impacts.

4.1.14 Public Services and Utilities

4.1.14.1 Assumptions and Assessment Guidelines

The following impact analysis considers the effects the Proposed Action would have on the existing Imperial County public services and the currently available utilities at the Mesquite Mine. Public service and utilities impacts would be considered significant if existing or proposed facilities would be insufficient to provide for the needs of the Proposed Action.

4.1.14.2 Impacts of the Proposed Action

Mesquite Mine is a permitted, open functioning mine. The public services and utilities are already in place; therefore, impacts of an expansion would not be considered significant.

Public Services

Mining operations would involve the handling and use of heavy equipment and hazardous materials (e.g., motor oil and gasoline), and create the potential for occasional work-related injuries requiring medical attention. The Applicant currently has procedures that provide employees with a safe workplace. The Applicant provides a security force, fire fighting systems and emergency medical services that adequately meet the requirements of the Proposed Action. As described in Section 4.1.13, Environmental Health and Public Safety, fires would be extinguished using on-site equipment and personnel. Imperial County fire fighting equipment personnel would not be affected.

Additional services would be available in Brawley, about 35 miles west of the site, and could be called upon in unusual emergencies (e.g., ambulance transport services). Consequently, the potential impacts related to availability of police, fire, and medical services would not be significant.

Community Facilities

The Proposed Action is not expected to generate significant population growth, and therefore any significant demand for local community facilities, in the communities in which any Project employees and/or contractors, and their respective families, who may relocate for their job with the mine.

Mesquite Mine employees and their families use the schools, recreational facilities and libraries located within the vicinity of their residences. The mine expansion would potentially create only 20 to 30 new jobs at the site, so there would be no significant increase in the demand for schools, parks, recreational facilities, and libraries.

Utilities

As described in Chapter 2.0 of the EIR/EIS, electricity is the primary source of non-mobile power for the Mesquite Mine. Most power usage is for pumping of water, and nighttime lighting. Other operations and maintenance activities require minor amounts of electricity. Electrical power needs

are obtained from the existing IID 92 kV power line and substation at the Mesquite Mine. Standby generators are available to provide power for essential facilities in the event of power outages.

There are no natural gas lines in the vicinity of the Mesquite Mine. Bottled gas is available from local distributors. Impacts to electric or natural gas supplies or purveyors would not be significant.

Telephone service is currently provided at the Mesquite Mine via an existing microwave station. No underground or overhead wires or cables would be required; therefore, impacts to communication systems would not be significant.

Water uses at the Mesquite Mine include truck washing, dust control and heap leaching. This water would be obtained from the existing Mesquite Mine well field and from any water that flows into the mine pits. A water pipeline currently extends from the well field to the Mesquite Mine. Impacts would not be significant.

Sanitation is handled with septic tanks and leach fields. The septic tanks are pumped periodically to keep the system biologically active and in good working condition. Pumped materials are transported off-site to an appropriate disposal facility. The amount of material pumped each year is negligible compared to the existing disposal capacity in Imperial County. Thus, impacts to sanitation facilities would not be significant.

As described in the Water Resources section of this EIR/EIS (Section 4.1.2), storm water diverted around the mine, and runoff directly from the facility, is directed to the three existing SR 78 wash crossings. Proposed drainage facilities would not increase the risk of downstream flooding or cause flood velocities or volumes that would cause the washout of downstream facilities or infrastructure. Therefore, impacts would not be significant.

4.1.14.3 Mitigation Measures

Incorporated by Regulation

- The Applicant shall supply all MSHA- and Cal MSHA-required training, supplies, and equipment.

- The Applicant shall provide precipitation drainage facilities as described by Section 4.1.2 of this EIR/EIS.

Incorporated Into Project Design

- The Applicant shall provide on-site security, fire protection services, and medical services.

- The Applicant shall construct a six- to eight-foot-high industrial fence, except where existing fencing can be utilized. All proposed expansion areas would be fenced where necessary for security and to avoid unauthorized entry. All new fencing surrounding the proposed mine expansion site would be constructed according to BLM specifications for tortoise fencing. Existing fencing has been improved in places to exclude desert tortoises from entering the Mesquite Mine. The existing fences would be further improved if required to successfully conclude consultation under Section 7 of the Endangered Species Act.

4.1.14.4 Level of Significance After Mitigation

With the implementation of required mitigation measures, impacts would not be significant.

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